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Including MODERN AIRPORTS

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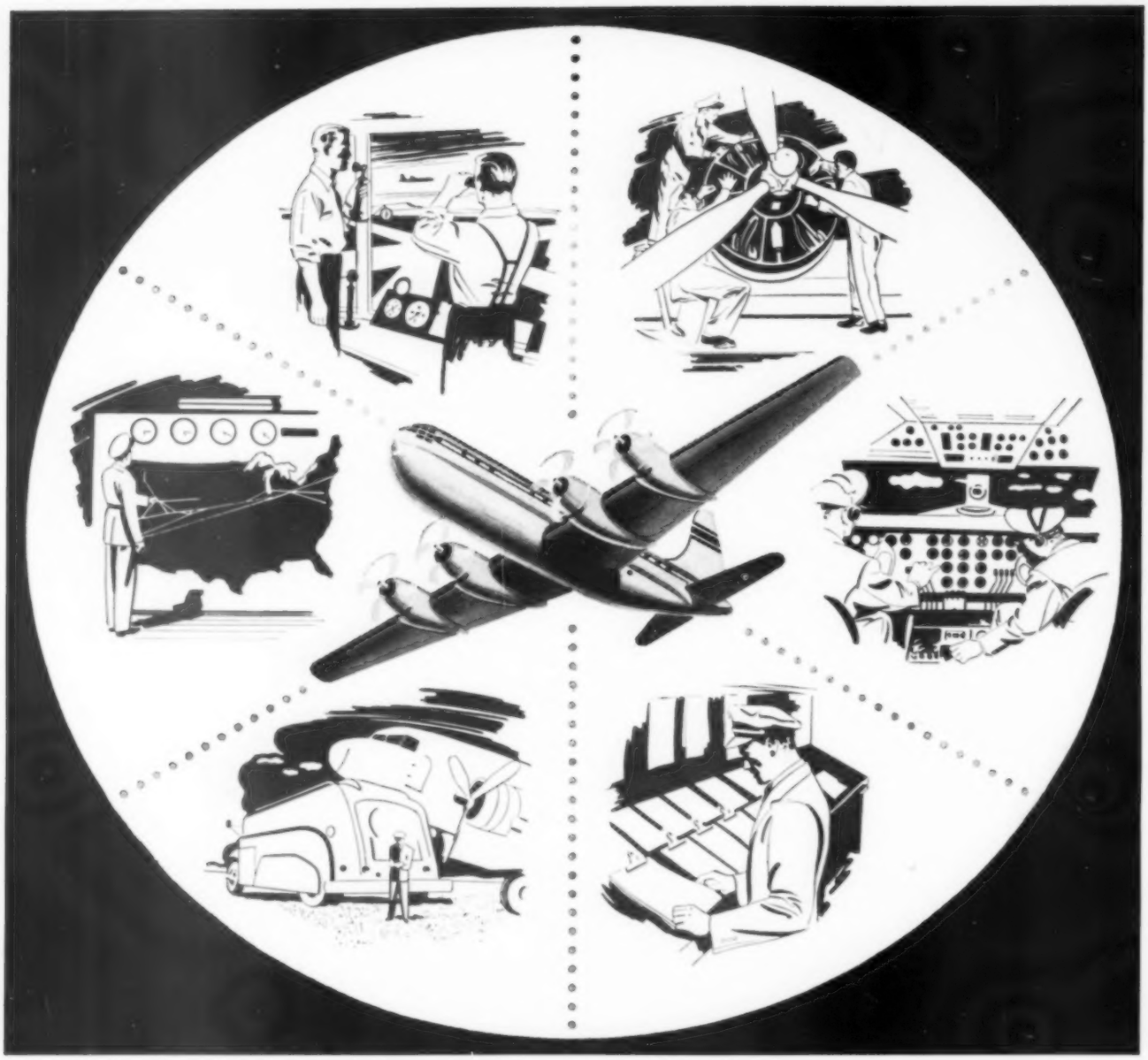
**MOONEY M-18L**

(See pages 15, 18, 19)



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FORWARD WITH *Aviation*

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**MAGNOLIA PETROLEUM COMPANY**

# WHAT'S DOING

ON the opposite page are two significant dates in aircraft engine history.

On the first, May 14, 1947, Pratt & Whitney Aircraft acquired an option to build its own version of the Rolls-Royce Nene jet engine.

The second, November 30, 1948, marks the date on which Pratt & Whitney delivered to the Navy the first production model of that engine—the JT-6 "Turbo-Wasp". It was installed in an F9F Grumman Panther.

In between those dates, there were 566 days. And nearly every one was a red-letter day in some department of Pratt & Whitney Aircraft. For, each one marked one more step in the completion of a task that may sound easy but actually took 18 months of the hardest kind of work by our organization.

Externally, the Turbo-Wasp looks pretty much like the original Nene engine. But there the resemblance ends. The redesign of many parts, the development of improved manufacturing processes to speed quantity production and, in some cases, the substitution of new materials represent only some of the problems encountered. All told, more than a million man-hours were spent in readying the Turbo-Wasp for production. That's equivalent to the full time of one man working a 40-hour week for 500 years!

Now, to all of this must be added the tooling-up that had to be done, shop rearrangement, actual production of the engine, testing and a host of other tasks requiring additional hundreds of thousands of man-hours—all accomplished within those 566 days. The opposite page will give you some of the highlights of this achievement.

The production of the Turbo-Wasp engine represents only one phase of Pratt & Whitney's continually expanding development program. Simultaneously, we are working on the even more difficult task of designing and developing from scratch, entirely new types of jet power plants. At the same time, we are continuing the refinement and development of the well-known Wasp line of reciprocating engines.

It keeps us pretty busy.

**PRATT & WHITNEY AIRCRAFT**

**EAST HARTFORD, CONNECTICUT**

ONE OF THE FOUR DIVISIONS OF UNITED AIRCRAFT CORPORATION

# at Pratt & Whitney Aircraft?

## 1,100 DRAWINGS

We received more than 1,100 different drawings of the original Nene engine. Every one of these had to be redrawn to conform to American drafting practice.

## 1,000 DESIGN CHANGES

The original engine had to be adapted to use American-built accessories, as well as to provide for the use of new materials or new processes suitable for quantity manufacture. We made more than 1,000 design changes to accomplish these objectives.

## 5,300 SPECIAL TOOLS

It takes all kinds of tools from a simple hand drill to a 400-ton hydraulic press to build an airplane engine. For the Turbo-Wasp we had to design 5,300 special tools. Counting changes, we made nearly 10,000 tool designs before we were ready to put the engine into production.

## 9,000 OPERATIONS SHEETS

Each step in the processing of each part of an engine has to be outlined in detail to give the shop all the information required to do the job. On the Turbo-Wasp our production engineers had to write up more than 9,000 such operations sheets. Many of these required the handling of new materials or the use of new processes previously unfamiliar to us.

## 225,000 SQ. FT. OF FLOOR SPACE

In order to build the engine, we had to have a place to do the work. We rearranged 225,000 sq. ft. of floor space (equivalent to 4 football fields) for manufacturing this one type of engine. This involved careful planning of production lines, and the installing or moving of thousands of hand tools, benches and other items of factory equipment as well as 259 machines.

## 35,000 MANUFACTURING OPERATIONS

There are 1,088 *different kinds* of parts in a Turbo-Wasp — 7,022 pieces in all. Each goes through many operations before it is ready for assembly into the finished engine. About half the parts are built here, the rest by a specially trained team of 150 subcontractors. Approximately 35,000 manufacturing operations are done by us in our own plant in making parts for one Turbo-Wasp. To that can be added the tens of thousands performed by our subcontractors.

## 1,700 HOURS OF TESTING

After a complete Turbo-Wasp was built, it had to go on a test stand and pass a rigorous 150-hour type-test. And that's only part of the story. Many sub-assemblies of this engine were tested for hours on end to make sure they would stand up in service. By the time the first engine was shipped, more than 1,700 hours had been spent in complete engine testing, exclusive of thousands of hours of component testing.

## 10,000,000 DOLLARS

From the time Pratt & Whitney Aircraft acquired its option to build the Turbo-Wasp engine until the first production model was delivered last November, we spent more than 10 million dollars on it. That's at the rate of more than 17 thousand dollars a day. This does not include many additional millions invested in new research and test facilities devoted to all types of jet engines.

JUNE, 1949 VOL. XXXI, No. 6

# Southern FLIGHT

Including MODERN AIRPORTS

**COVER:** Single-seater Mooney M-18L, manufactured in Wichita, Kansas, has 65 hp. Lycoming engine. Flight-test story describing it is published on page 18 of this issue.
—(SOUTHERN FLIGHT Photo by E. H. Pickering.)

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## AIR Report

### Significant Trends and News

**CAA'S NEW OFFICE OF AVIATION DEVELOPMENT,** headed by pioneer airman Wiley Wright, is being launched to encourage and participate in a wide range of activities aimed at private flying and non-scheduled aviation progress. . . . **LUSCOMBE SEDAN** now has 185-hp. rating with new automatic 2-position Hartzell prop and is priced at $8,485 which includes new prop and other refinements. Performance is advertised at more than 145-mph. cruise at 7,000 ft., take-off at 2,280-lb. gross in less than 500 ft., and initial sea level rate of climb of over 1,200 fpm. at gross. . . . **THERE WILL ALWAYS BE A STINSON,** says W. T. Piper in announcing establishment of his firm's Stinson Division for new Stinson model study.

**PACKAGED HELICOPTER LEASE DEALS** are offered instead of outright sales by Kaman Aircraft Corp., on its newly NC'ed K-190 'copter. Pilot, mechanic, maintenance, gas, oil and insurance are included.

**JET ADVANTAGES** over piston engines in lightplanes, discussed in an Institute of Aeronautical Sciences paper by S. D. Hage, director of Boeing Airplane Company's development of a 200-hp. gas turbine, include less power loss at altitude, more excess power for acceleration, considerably improved high speed performance, and less engine weight. Weight advantage is 200 lbs. since Boeing jet weighs only 150 lbs. Carried as fuel, this weight advantage would be eaten up by consumption in about 3 hrs. Boeing Model 502's consumption is 1.5 lb., which is less than costs of military piston engines. Production costs are expected to be less per hp. for small jets than for piston engines. Large military jets now average $11 per lb., which is less than costs of combat piston engines of same weight. Lightplane jet advantages are worth reaching for, the engineer commented.

**CHASE AIRCRAFT, INC.,** of West Trenton, N. J., has applied to CAA for an air carrier ATC on its 32,000-lb. twin-engine "Avitruc" cargo plane, developed for Air Forces. . . . **LOCKHEED XF-90,** twin-jet needle-nosed "penetration" fighter, has been taxi-tested by Tony LeVier. It now grosses about 25,000 lbs. and has 35 degrees of wing sweepback . . . **A NEW ALLISON TURBO-PROP** engine has entered flight test in the nose of a B-17. No details.

**BONANZA ECONOMY CRUISE** found most efficient during his Honolulu-Teterboro hop was given to us by Bill Odom during a Dallas reception with Beech Distributor J. D. Reed as host. Says Odom: "By using 1,750 rpm. at 11,000 ft. and an indicated air speed of 110 mph. I got 28 miles per gal."

**ANYBODY GOT A TRAVELAIRE 6000 OR AN OX-5 JENNY?** If you know of either as being available, write SF editors without delay. . . . **AVIATION FRIEND IN SENATE** is Senator Elmer Thomas of Oklahoma. His Congressional Record remarks of April 20 on the airplane as a farm implement and his work toward straightening out the GI flight training mess reflect his deep interest and competency in non-scheduled aviation. He was busy at press-time overhauling VA officials in committee hearings on GI flight training.

**HOUSTON INTERNATIONAL AIRSPEED RUN** on July 3-4 at La Porte Airport in Houston will attract hundreds of pilots, operators and their friends. Dot Lemon will attempt to break the 469-mph. record for propeller air-

*(Continued on page 27)*

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# NEW POWER FOR THE "SUPER" DC-3

## . . . Cyclone 9 Now Certified at 1475—1525 Horsepower

The CAA has issued a Type Certificate approving the Wright Cyclone 9HE — with a take-off power range of 1475 to 1525 horsepower— for commercial air transports.

To the Douglas "Super" DC-3 this latest version of the world-famous family of nine-cylinder Cyclones brings . . .

. . . *new power*—1475 to 1525 horsepower for improved take-off performance.

. . . *light weight*—the lightest weight engine in its power class. The Cyclone 9HE weighs only 1390 pounds — less than one pound per horsepower.

. . . *economical operation* — because of lower fuel consumption and improved cylinder cooling characteristics.

. . . *low maintenance and overhaul costs* — because of the simplicity of design inherent in single-row, radial engines.

. . . *other advanced features*—torquemeters for accurate power control and to permit use of automatic propeller feathering — water injection for maximum take-off horsepower with 100 octane fuels.

Since its early association with the Douglas twin-engined transport, the Cyclone 9 has steadily progressed with this "father of the airliner." Today it is ready again to improve the performance and extend the usefulness of the DC-3.

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# Just among ourselves

EDITORIALS

## BIRDS OF A FEATHER

THERE is a remarkable similarity between recent statements made by two transportation executives, one by W. G. Vollmer, president of the Texas and Pacific Railway Company, and the other by C. R. Smith, president of American Airlines. Smith's statement was in support of a bill introduced by Chairman Johnson of the Senate Interstate Commerce Committee which proposes to separate money paid to the airlines for hauling the mail from the money paid as out-and-out subsidy. Referring to the present situation as a "cost-plus" proposition, Smith believes it will lead to so much government interference as to make airline management both uninteresting and ineffective, lead to nationalization of the airlines and repeal of the "need" section of the Civil Aeronautics Act of 1938. So long as the theory of cost-plus prevails, Smith believes, there will continue to be insufficient incentive for logical merger and the net result will be continuation of transportation units which are not logical and which must be supported by payments from the Federal treasury.

The railroad executive likewise is afraid of ultimate nationalization. In Vollmer's opinion the American railroad industry is in a critical and paradoxical situation because the political and economic conditions of the nation are forcing the industry "steadily down the road of state ownership." These conditions are (1) excessive regulation and taxation, (2) increased cost of materials, supplies and wages and (3) subsidized competition. It appears that the airline companies share with the railroad operators the first two conditions. On the matter of subsidy the railroad executive has this to say:

"Although the declared purpose of Federal regulation is to maintain competition and preserve the inherent advantages of each type of transportation agency, it is abundantly clear that competition today between the several modes of commercial transport is wholly artificial and unsound. Where basic facilities are provided and maintained at government expense as is the case with these competitive forms of transportation (i. e. air, water, highway), the rates and fares charged for their services do not reflect the true and actual costs of operations."

The most striking similarity between the two statements is the firm conviction of both men that the American conception of free and private enterprise is not being followed by the United States government in its administration of laws governing air and rail transportation companies.

While President Vollmer of the Texas & Pacific believes that the salvation and the remedy "lies in the withdrawal of all forms of subsidies and in the adoption of a national transportation policy which will provide equal treatment and equal opportunity for all commercial forms of transportation" it is interesting to note that President Smith of American Airlines stands in favor of the conception that the administration of the Civil Aeronautics Act "must preserve us from the deadening influences of continuing subsidy and must preserve the policy that efficiency will be rewarded and lack of efficiency will be directly penalized."

Could it be that the competing forms of transportation in the United States probably have more problems in common than individual problems that force them, under the vigorous stimulation of competition, to fight one another tooth and nail? Could it be that our airlines, our truck, bus and steamship operators have a definite selfish interest in the proposition that American railroads must survive as a principal element in our free enterprise system? And finally, doesn't it stand to reason that once other forms of transportation become state-owned the dead hand of socialism can be expected to move into other forms of transportation and into other basic industries?

The idea to separate mail pay from subsidy, to provide incentive for efficiently operated airlines and to mete out penalties for inefficiency, certainly does seem to have a great deal of merit. But it is our firm and sincere conviction that competitive forms of transportation might well stop the practice of the pot calling the kettle black, attempt to understand the peculiar problems and values of each brand of transport and work in harmony for a more enlightened Federal policy for all forms of transportation. It is beginning to become apparent that at least the airlines and the railroads have a common enemy in the continued threat of nationalization and that they may not be such vicious enemies as a lot of people would have us believe. At least certain segments of airline and railroad leadership seem ready to stand or fall on the basis of our free enterprise system.

## SLOW MARKET

THE usual seasonal spurt in airplane sales has failed to materialize this year; it's a bitter disappointment to that segment of our industry which always depends on this season of the twelve-month to enjoy a little prosperity after spending the slow and dismal Winter months just waiting for April and May weather and the prospects to show up.

Optimism is a mighty rare item in the personal aircraft business today. The general business recession has started to pinch. People in the income brackets justifying plane ownership and operation just aren't interested in buying anything at the moment. There is a general feeling of watching and waiting to see what's going to happen. Some of the most successful airplane dealers in the nation admit that good prospects are as scarce as hens' teeth, that sales efforts which produced business last year produce nothing this year.

*(Continued on page 28)*

"Need a ride across the field? Hop in!"

"Hotel room? We'll do our best."

"Say your old Aunt lives on a potato farm east of Dallas? Nope, don't know her — but we'll scratch around and try to find her for you."

That's a Southwest Airmotive Company employee talking to a pilot. Maybe the pilot won't buy anything more expensive than a two-bit flight map. Makes no difference. He'll get the round of SAC's famous EXTRAS anyway — EXTRA hospitality, EXTRA courtesy, EXTRA help in solving his problems.

Our latest EXTRA is in the form of a booklet called THE VISITORS COMPASS — just a little thing, about the right size to stick in your shirt pocket. But we think you'll find it useful. It lists phone numbers for such places as the weather bureau, control tower, Dallas Radio, hotels, and airlines. It suggests places to eat and to have fun. It carries a detailed diagram of the field, with official airport rules, and has the only complete chart on Love Field communications facilities.

We'll be passing out copies of THE VISITORS COMPASS to our friends on the flight line, right along with all those other EXTRAS in which we take such a pride. We hope you like it. If you want an advance copy, drop us a line and we'll shoot you one by mail.

**"THE FLAT RATE COMPANY"**

# Southwest Airmotive Co.

**CAA APPROVED AIR STATION NO. 195 LOVE FIELD, DALLAS**

On April 15, 1949, the Convair XC-99 made a flight of about three hours at Fort Worth, Texas, with a pay load of 100,000 pounds.

Powered on its first flight under full load

(*the heaviest pay load ever carried by an airplane*)

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## ANNOUNCING A SENSATIONAL 1949 2-PLACE Cessna 140

IT'S BIG NEWS! Good news! For now this great new 2-place Cessna offers even finer performance, even greater utility...at low cost! It makes cross-country business and personal flying safe and practical for thousands!

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Four-place airplanes have amassed a remarkable record of dependability in scheduled intra-state passenger service. Here are passengers boarding a Navion in South Texas. —(Val-Air Lines Photo.)

# A Logical Pattern for Local Air Service

**By E. H. PICKERING and BOB WEMPLE**

THE need for small airlines has existed all along but recognition of that need is only now becoming widespread. Carriers which once were small have become major operators and concepts of air service have changed right along with their aircraft designs and performance. Where they once prospered through local service with frequent stops they now find it more practical and profitable to concentrate their large seating and cargo capacities and greatly-increased speed in service linking major metropolitan centers. In the process the small airline concept has been left behind, along with local service needs. The trend has been toward larger and faster transports, more costly airport facilities and longer hauls—all this placing trunk airlines farther and farther away from small communities.

There is a remedy to the local air service problem but it imposes a challenge which has yet to be met in certificated operations. Postwar "feeder" airline attempts to achieve it have not succeeded except in a few isolated cases. Failure has been due largely to the unrealistic approach which has characterized all certificated feeder airline operations—multi-engine transports are being used which are inherently incapable of economically meeting small airline requirements. Single-engine airplanes of postwar design could perform the job much more effectively and profitably. Actual feeder airline records since 1946 prove convincingly that (1) passenger, mail and express loads are not large enough for efficient utilization of available space in the multi-engine transports being operated and (2) available multi-engine transport operating costs and requirements exceed small community traffic requirements.

Here is the official record from the Civil Aeronautics Board's statistics: During the fourth quarter of 1948 (later quarterly figures are not yet available) *all certificated feeder airlines in operation averaged only* 5.39 *passengers and* 52.7 *lbs. of mail per airplane mile.* Most of these schedules were operated with DC-3's which must average far greater loads than that just to break even.

However, such DC-3 losses do not prove the feeder airline idea a failure. It does prove that feeder traffic has not in most cases met DC-3 requirements and vice versa. Of more importance, it also proves that the traffic already generated—5.39 passengers and 52.7 lbs. of mail per trip—is adequate for and reflects the need for small airplanes such as the 4-place Navion, Bonanza and Cessna types

**Larger cities monopolize domestic air transport service despite postwar expansion. Here's a practical solution to the problem facing hundreds of transportation-poor communities**

developed since the war and proved economical and dependable through many thousands of hours of private operations. No small multi-engine transport exists on the market which could perform the job as efficiently as these single-engine types, but single-engine operations on an interim basis should soon encourage the development and marketing of multi-engine designs which could provide efficiency and other required characteristics. Until then, the postwar 4-place airplane could carry the average DC-3 feeder airline load in two sections and still do it more effectively than a single Douglas. Thus frequency of schedules, a major factor in the cultivation of traffic but impractical in DC-3 feeder operations at average loads cited in the tabulation at right, would give the small airplane a valuable advantage over the larger transport.

Dependability, comfort and performance of the postwar 4-place airplane represent remarkable progress over prewar airplanes of 500-1,000-lb. payload capacity. Since none has been operated by a certificated airline, no standardized airline costs are available. But their direct operating costs, including depreciation of original investment, are familiar to thousands of private owners. For example, rent-a-plane services are available to the public in which a 4-place Bonanza, with pilot and insurance, may be chartered for as little as 12 cents per mile. Charter rates for a DC-3, with pilot and insurance, usually average 8 times that amount.

Passenger acceptance of small airplanes is reflected in the extensive intra-state scheduled operations of two non-certificated small airlines during the last two years. Together, these two airlines—Val-Air in South Texas and Carco Air Service in New Mexico—have operated over 5 million passenger miles in 4-place Navions and Bonanzas. Their passengers are enthusiastic supporters of the small airline idea and their acceptance of small airplanes cannot be questioned. The same thing applies to thousands of private owners and users of postwar 4-pl. airplanes. Since the war approximately 4,000 Bonanzas, Navions and Cessnas have been in operation.

Their dependability is excellent when single-engine airplanes of postwar types are operated with competent know-how on airline standards of scheduling and maintenance. Many of these airplanes are averaging 300 hours or more of transportation per year. Utilization on that scale is difficult to achieve without dependable performance. It is an effective yardstick to the 4-place airplane's usefulness in transportation and leaves no doubt about its ability to operate efficiently day after day throughout the year.

Already there are signs of growing CAB interest in small airlines. In a recent proposal to allow a feeder certificate to expire without renewal because of disappointing DC-3 results, the Board made the statement that its views do not preclude the use of single-engine airplanes on the route under examination. Shortly afterwards, the Board circulated a proposed revision of Civil Air Regulations (which now prevent the use of single-engine aircraft manufactured after June 30, 1942), that would enable certificated feeder airlines to use small airplanes instead of multi-engine craft. Proposed revisions would approve single-engine craft for scheduled passenger operations under visual flight rules in daytime operation. In addition industry comment is requested on the possibilities of permitting limited VFR operations at night depending on favorable terrain and other factors. Instrument flight would not be permitted.

Local air service is not as frequently handicapped by instrument weather conditions as long-haul air service. Most short-haul air service would operate at altitudes from 500 to 2,000 ft. above the ground, always under the overcast and never on top, whereas most long-haul air service is at altitudes involving instrument conditions more often than not. Climbs to altitude would make local air service impractical. But instrument flight is essential to successful long-haul trunkline air service.

## Analysis of Feeder Airline Loads
## Fourth Quarter, 1948

(Source: Civil Aeronautics Board)

| CARRIER | Average Available Seats | Average Revenue Passenger Load | Average Pounds U. S. Mail | Average Pounds Air Express | Average Pounds Air Freight |
|---|---|---|---|---|---|
| **All-Carrier Average*** | 20.33 | 5.39 | 52.7 | 22.4 | 32.5 |
| **Challenger** | 20.00 | 3.48 | 66.8 | 42.4 | 71.8 |
| **Empire** | 20.82 | 5.16 | 44.6 | 18.1 | ..... |
| **Florida** | 8.07 | 2.05 | 24.2 | 8.1 | ..... |
| **Monarch** | 17.87 | 3.70 | 35.7 | 20.4 | 97.1 |
| **Piedmont** | 21.13 | 5.78 | 26.1 | 27.7 | 27.7 |
| **Pioneer** | 24.02 | 7.24 | 57.7 | 14.0 | 30.5 |
| **Robinson** | 21.00 | 6.93 | 47.2 | ..... | 49.6 |
| **Southwest** | 24.00 | 7.87 | 60.3 | 31.5 | 73.7 |
| **Trans-Texas** | 21.00 | 3.78 | 67.3 | 10.6 | 8.4 |
| **West Coast** | N. A. | N. A. | N. A. | N. A. | N. A. |
| **Wisconsin Cent.** | N. A. | N. A. | N. A. | N. A. | N. A. |

*All-carrier average includes feeders listed plus all American (mail pick-up) and Los Angeles Airways (Helicopter mail).

Development at this time of small airlines will be a progressive step in the establishment of a secondary air service so urgently needed in the nation's expansion of trade and commerce. It will fill the gap left open by the trunkline air service when it stepped up its payloads and cruising speeds. The costs of servicing these transports are too great for their application to local air service. Small communities cannot bear the costs of ground facilities to accommodate 300-mph. airliners as now operated and faster transports yet to come. Air service between trade centers, or metropolitan areas, is a distinctly different undertaking from air service between local communities and their trade areas. The latter involves a new and progressive concept of air commerce. It is in no way a backward step or a retrogression, as the suggestion of "single-engine airlines" seems to indicate. Single-engine airplanes are involved only because suitable multi-engine transports have not been developed or offered on the market. Successful single-engine operations encourage and justify investments in new multi-engine designs meeting local air service requirements.

Three applicants for CAB certification as small airlines have been encouraged by the Board's immediate scheduling of hearings on their proposals. All three hearings have been scheduled for June 20. That date bids fair to become an important one in air transportation. It may well be the start of official processes in which local air service would be launched within a year. The three applicants are Val-Air Lines of Mercedes, Texas; Carco Air Service of Albuquerque, N. Mex., and Purdue Aeronautics of Lafayette, Ind. These operations may well blue-print the beginnings of a local air service network eventually destined to benefit hundreds of progressive small cities and their trade centers throughout the nation, operating hundreds of small transport aircraft.

Defense needs, too, will be served by such a development. Theories gave way to cold facts and reality during the war in which the defense value of air transport became firmly established. However, military air transport is top-heavy with large aircraft. As in airline operations, they too are becoming larger and faster and their optimum usefulness is restricted to long-range hauls without intermediate stops. Military air transport, like its civil counterpart, is inefficient, impractical and uneconomical when operating with small loads—but only because more adequate small planes have not been procured and put to work. This neglect finds the military services without a postwar design in small multi-engine transport aircraft. The twin Beech, as in the

*(Continued on page 28)*

# Automatic Propeller Control For Better Bonanza Performance

## Low-cost electronic governor converts Beech propeller for constant-speed efficiency

By ROBERT HASKINS
President,
Flight Research Engineering Corp.

CONSTANT-SPEED governors have been used on all airplanes of higher horsepower for many years. Automatic control of propeller pitch to maintain constant engine speed makes possible shorter take-offs, increases fuel economy and reduces the attention required of the pilot to engine controls. These advantages are equally applicable to planes of lower horsepower. In the past, however, few private planes have been equipped with propeller governors due to the complexity, weight, and cost of such equipment.

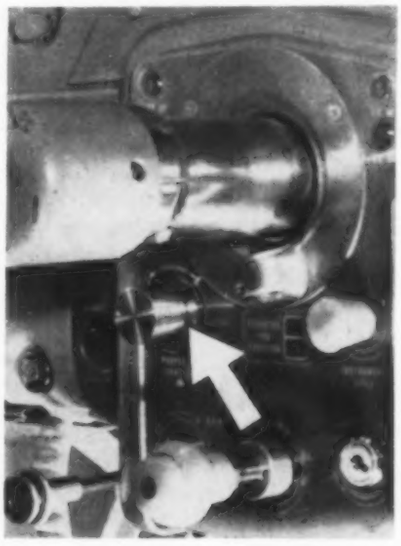
The Flight Research APC (automatic propeller control) is an electronic governor that has been specifically designed for private planes such as the Beechcraft Bonanza. It controls the original propeller and affords a complete constant speed system. It is priced at less than $300 and installation in the Bonanza requires less time than installing a new panel instrument.

### Take-Off

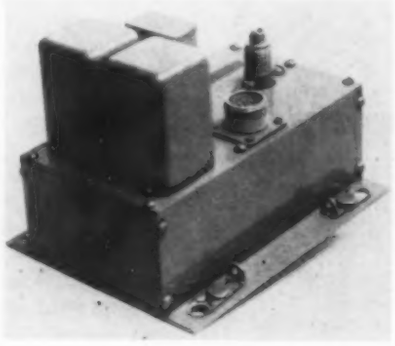
In order to achieve take-off in a minimum distance the rated power of the engine must be attained at the start of the run when the brakes are released. To achieve this rated power, maximum allowable rpm. must be used. This rpm. cannot be achieved at low air speed without full flat propeller pitch. As soon as the brakes are released and the plane gains speed, the engine will quickly overspeed unless increased propeller pitch maintains the rated rpm. at the safe limit. The APC will maintain rpm. at its maximum allowable value throughout the entire take-off run, which will allow the engine to deliver its full rated power from the start of the run. No additional strain, however, is placed on the engine since only rated power is used, and the governor automatically prevents the overspeeding.

### Landing Approach

APC has two distinct advantages. First, since the propeller pitch stops can be set at full flat pitch, the blades will act as an air brake at low throttle settings, permitting an appreciably steeper glide angle than is normally possible. On an approach the APC is set for "take-off" so that full power will be immediately available in the event of a go-around. At approach air speed and at reduced throttle setting the APC will automatically call for flat pitch causing the blades to act as an air brake.



Arrow points to constant-speed control knob, rotated for any desired rpm. value from 1,700 to 2,300. Original manual control switch can still be used if desired, but is thrown to full left position for constant-speed operation.



This unit, measuring 6.5 ins. by 3.5 ins. by 2.25 ins. and weighing 3 lbs. maintains constant propeller speed electronically, regardless of changes in air speed, throttle setting, altitude or gusts. It is shock-mounted under instrument panel. Original propeller and pitch change motor is utilized.

### Cockpit Procedure

Since an APC automatically maintains constant speed, the pilot need give attention only to the following four operations throughout an entire flight:

(1) Set knob for take-off,
(2) Set knob for climb,
(3) Set knob for cruise,
(4) Set knob for take-off position on landing approach.

### Fuel Economy

Low fuel consumption can be achieved only by precise cruise control, which means primarily maintaining power settings that produce the maximum number of miles per gallon at a desired ground speed. The APC holds the rpm. that has been set for most efficient cruise without attention from the pilot, which is of considerable importance in turbulent air. Further, in order to achieve fuel economy, climbs and descents must also be made at an efficient engine speed. Although climbing represents a small proportion of the time of the flight it is extremely important from the standpoint of fuel consumed at higher engine power.

The writer recently made a non-stop flight in a Bonanza of 1,316 miles with an average ground speed of 193 mph. (true air speed of 154 mph.). Total fuel consumed was 50 gallons for an overall fuel consumption of 7.3 gallons per hour. This aircraft was equipped with a Flight Research APC maintaining 1,850 rpm. throughout the entire flight. The actual fuel mileage was 26 mpg., and the no-wind figure was 21 mpg.

### The APC in the Bonanza

The APC unit is mounted under the instrument panel, and is connected by a flexible shaft to the APC propeller speed knob located to the left of the

*(Continued on page 31)*

# Collegiate Air Meet

BIGGER and better air regattas for undergrads are stimulating growing interest in competitive flying among colleges and universities. At last month's National Intercollegiate Air Meet, with Texas Christian University as host, competitors numbered 68 collegiates and coeds comprising 12 teams from California, Colorado, Minnesota, Nebraska, Oklahoma, Michigan, and Texas. UCLA emerged top scorer in two days of events including spot landings, navigation and bomb dropping. Miss Sue

*(Continued on page 21)*

Spot landings kept officials running as collegiate contestants tried their skill (right). Queen of the meet was Betty Jo Ingram, OU, shown with friends (below) as they watched events from wing of Mooney M-18L. Bill Piper (below, right), always present when youth flies, was on deck with his popular new 4-pl. Clipper. Stephens College girls in the lower right scene were briefed by their faculty instructor just before the contest.
—(SOUTHERN FLIGHT Photos by E. H. Pickering.)

Operated by Navy crew, 180-passenger Lockheed Constitution is shown above breaking ground in 3,000-ft. take-off from Love Field in Dallas. Jato bottles (left) for overloaded or altitude take-offs are mounted in wings three to the unit near inboard engines and aimed 7 degrees below horizontal (vertical caps are emergency relief valves). Close-up at bottom shows massive 3,500-hp. Pratt & Whitneys and forward lower-deck cargo hold. —(SOUTHERN FLIGHT Photos by E. H. Pickering.)

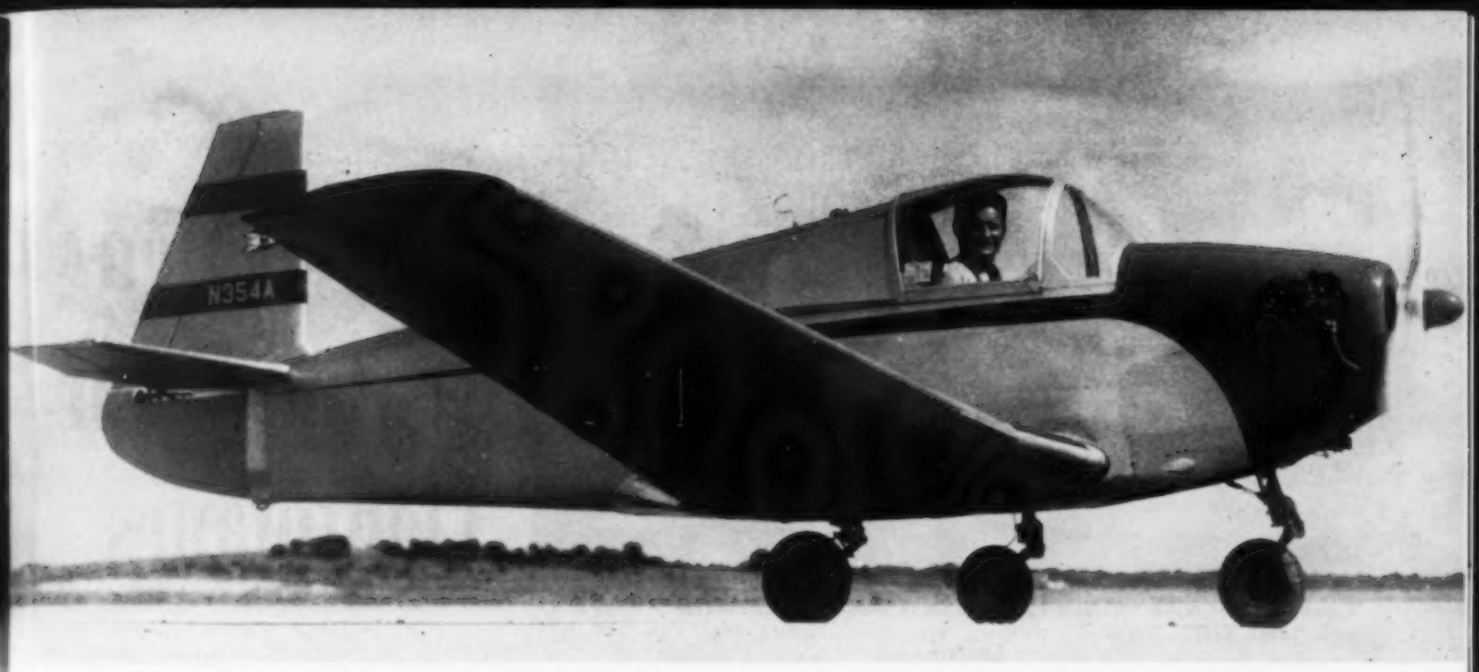
# New Approach for Transport Progress

THE Navy's new 180-passenger, 92-ton Lockheed Constitution now has over 700 hours of transcontinental and short-haul passenger operations behind it. Through a Navy arrangement unique in prototype development, which neither the airlines nor the manufacturers could afford, results of intensive flight evaluation as well as engineering are to be made available to all military branches, interested airlines and manufacturers.

Commercial air transport requirements influenced designing of the 275-mph. 4-engine Lockheed. Sea level performance at gross weight includes 3,000-ft. take-off and 2,300-ft. landing over a 50-ft. obstacle.

On a flight during which SOUTHERN FLIGHT staffers were aboard, take-off was made from Denver with Jato assist, which was distinctly heard and felt as the steep climb got under way. Cruised at 12,000 ft., air speed was 181 mph. on less than 50 per cent of power and consumption was said to have been 90 gals. per hr. per engine. Total fuel load is 9,600 gals. Crews can service engines and landing gear in flight. Engine accessories can be replaced in flight from within the wing.

For the landing at Love Field in Dallas, the approach was as short as commercial airlines use, if not shorter. Touchdown in the first 100 ft. of runway occurred at a slow 75 mph. and no impact or landing jolt was felt. This was explained as being due to pre-rotation of main wheels with electric motors, improved-type oleos and the Constitution's handling characteristics at slow speeds. An electric light flashes in the cockpit to inform the pilot when his wheels are on the runway, so soft is the touchdown. Inboard engines were reversed as the nose wheel went on and the big ship stopped short after a 2,000-ft. roll. ★ ★ ★




Clean lines of Mooney M-18L with 65-hp. Lycoming are emphasized in this side view. Grossing only 780 lbs., it accelerates fast on take-off, climbs at better than 1,000 fpm., cruises at 115 mph., stalls at 42 mph. IAS with power and is surprisingly comfortable. —(SOUTHERN FLIGHT Photo by E. H. Pickering.)

# Flying the Mooney Single-Seater

**By BOB WEMPLE**

A CROSS-COUNTRY trip test in the Lycoming-powered Mooney M-18L has established the little low-wing tricycle single-seater as being capable of giving service on the order of 115 mph. for cruising and possible economy cruising up to 35 miles per gallon of gas. That's real performance for an airplane selling for $1,995.

A cruising speed of 115 mph. is remarkable considering its small Lycoming produces 65 hp. at full throttle. This is faster than most 2-pl. airplanes equipped with 85-hp. engines and is more economical. Rated power is at 2,550 rpm., and we got a reading of 109 IAS at 5,000 ft. with 2,450 rpm., and a reading of 105 mph. at 2,000 ft. with only 2,350 rpm. We have averaged a good 100 mph. block-to-block speed in the Mooney against 15-mph. winds.

Several interesting features are found in the Mooney. It weighs only 500 lbs. empty and grosses 780 lbs. Useful load of 280 lbs. includes 11 gallons of fuel, 4 quarts of oil, 40 lbs. of baggage, and pilot. Its small wing has only 95 sq. ft. of area. Wing loading is 8.2 lbs. per sq. ft. Power loading is 12 lbs. per hp.

The cockpit has a neat sliding bubble canopy. Seated inside, you find surprising comfort for such a small airplane. On the left cockpit wall is the trim indicator, a marker on a chain which moves by crank control from take-off through climb to cruise position. This trim control is connected both to the flaps and to the tail assembly, which pivots all in one piece—vertical fin as well as horizontal stabilizer. Only the tail is actuated when trimming for take-off, climb and cruise. But trim back for landing and the flap automatically trims in coordination with the tail assembly.

The seat is more comfortable than you expect and it has a comfortable seat back. Fold this and you can unfasten a fabric cover to reach the baggage compartment. Because of weight and cost considerations, a starter is not standard equipment.

Visibility in the Mooney is excellent. You feel mighty close to the ground until you taxi a hundred feet or so, becoming accustomed to sitting so low.

There is a real thrill in the acceleration of the Mooney as you open the throttle. It's so fast you seem to jump into the air almost immediately. We were within about 50 lbs. of gross weight, having full tank of gas but no baggage, but the Mooney began climbing out as if it were empty. We reached under the right side of the instrument panel and pulled down and back on the landing gear lever, manually retracting the gear without much effort. The gear folds quickly, without any wasted motion. After you have the lever back, you fit the end of it into a hole by the corner of the seat. That locks the wheels into "up" position.

With gear up and throttle closed, a unique warning indicator goes into action. It is a little round disc, painted red, on the end of an arm, and it waves frantically back and forth, right in front of your eyes. Mooney developed it from a windshield wiper.

With gear up and locked, it's an experience to watch the Mooney climb. We had been told to climb it at about 65 mph. At that speed and with full throttle giving us 2,200 rpm., we climbed to 1,000 ft. the first minute, 2,700 ft. the third minute and 4,200 ft. the fifth minute. That's a lot of climb, but we learned later that the Mooney will do much better with a climbing speed of about 80 instead of 65. Mooney advertises it will climb to 10,000 ft., given as optimum cruising altitude, in 12 minutes. We had a broken overcast for our flight and didn't go above 5,000 ft.

In the stalls we found that the Mooney has real stability. With power on we had to pull the nose quite high

*(Continued on page 18)*

Koppen-Bollinger experimental is 85-hp., 100-mph. modified Piper capable of flying at 27 mph. Large prop, "hush-box" muffling, large flaps, leading edge slats and split rudder are used.

# New Design Features For Lightplanes

## Slow-flying Helioplane and high-visibility pusher promise improved utility for 2-place planes

By TOM ASHLEY

INTERESTING design features for experimental personal airplanes are being developed outside of the lightplane industry. The odds against a dark horse in the highly-competitive market are growing. But the need for experimentation and improved utility was never greater, and persistent individuals with strong design and marketing convictions may yet come up with answers capable of making private flying more practical for more people.

Will these answers be found in slow flight? Some think they will — slow flight makes available smaller and therefore more numerous and better located flight strips and makes for greater safety. Two well-known professors have revealed a few details of a new spinproof 2-place slow-flight airplane they have developed with their own funds after unsuccessfully attempting to interest others, including manufacturers and the government, to sponsor the project. They are Otto C. Koppen, professor of aeronautical engineering at Massachusetts Institute of Technology, and Dr. Lynn Bollinger of the Harvard Graduate School of Business Administration.

Slow flight in tests of the new Koppen-Bollinger airplane means the ability to fly at 27 mph. without stalling. It is powered by an 85-hp. Continental engine and is said to cruise at 100 mph. or better. The developers also claim their airplane, called the "Helioplane" because its fixed-wing performance approaches that of the helicopter, has demonstrated ability to land and take off from an area no larger than a tennis court, and to clear a 50-ft. obstacle after a take-off run of only 300 ft.

It is a tube and fabric airplane resembling a Piper Vagabond but featuring full-span flaps and leading edge slats. It also features special exhaust muffling and a very large two-bladed propeller in an effort to eliminate noise and thus overcome complaints of airplane noise nuisance around flight strips located in residential areas. It incorporates cross-wind landing gear.

Other than those details, little has been revealed by the developers of the high-wing monoplane which they describe as a "revolutionary lightplane which makes little more noise than an auto and is capable of safe, everyday operation from a tiny strip of ground in the heart of a built-up area."

### Utility at a Premium

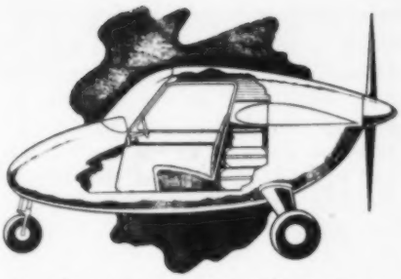
Cost of the Helioplane, its designers admit, will be about $500 more than comparable conventional lightplanes, although they hope for a large enough market justifying quantity production and resultant economies. "After a few years—if, as they hope, mass production techniques can be applied to personal aircraft for the first time—the cost of a fully-equipped four-place Helioplane should be comparable to that of a medium-priced car," says their publicity release. Under existing plans, others would be licensed to manufacture the Helioplane and commercial production within a year is hoped for.

Professor Koppen is widely respected for his research and development work at MIT, while Dr. Bollinger, a former airline pilot and airport operator, has gained notice more recently with his Harvard studies of airports and lightplane markets. Bollinger began his search for "revolutionary" lightplane performance four years ago and a year later joined hands with Prof. Koppen, utilizing design features which the latter had already conceived. They found it "impractical" to interest government agencies and manufacturers in sponsoring their design and invested their own savings in the project. Word of their experiment spread but details were withheld. Finally, the plane's first flight was made in so-called secrecy last April with Prof. Koppen at the controls. Since then the test pilot has been John W. Phillipps of Norwood, Mass.

A great deal is being claimed for the Helioplane. Among the claims are these, as quoted from the original Helioplane announcement: "Also of significance is a simple system for attaining good stability and control at ultra-slow speeds—a problem which has heretofore baffled designers. . . . The Helioplane uses mechanical methods for restricting propeller noise and the engine racket is eliminated by a 'hush-box' which Professor Koppen developed and patented several years ago."

### Texas Pusher Progress

While the Koppen-Bollinger experiment in Boston continues toward the elusive and costly goals of CAA certification, manufacturing and successful marketing, another persistent innovation is receiving finishing touches



AG 14's cabin is suspended from wing on keel beam, thus providing large doors and windows. Floor is 16 ins. from ground.

Long, narrow wing of all-metal, 90-hp. AG 14 is shoulder high and behind seat. High horizontal stabilizer gives smaller change in trim between power off and power on and is equivalent to moving elevators out of slipstream as on new Ercoupe and NACA spinproof Piper Cub.

in Houston, Texas, where the Anderson, Greenwood & Co. Model 14 2-p[1]. pusher appears to offer several promising design features.

Will the long-sought "airplane of tomorrow" be a pusher? It has problems—wing-body aerodynamic interference, balance, engine cooling and shafting, soundproofing and unconventional structure—but it also has attractive advantages which even the Koppen-Bollinger Helioplane doesn't offer. They are visibility and low-to-the-ground cabin for easy entry and comfort. Pusher problems have been avoided by the more cautious designers but Marvin Greenwood, chief engineer behind the experimental Model 14, says they are not impossible of solution.

Greenwood and his associates have over 230 hours of flight test behind the Model 14. They expect to complete CAA certification requirements this Summer, until which time they prefer not to speculate on sales or selling prices although they admit that the pusher's unconventional structure will probably mean higher costs than conventional designs.

All-metal, the AG 14 is powered by a 90-hp. Continental engine, has fixed landing gear with steerable nose wheel and carries its tail on twin booms attached to the wing center section. Occupants are seated forward of the wing leading edge in a 44-in. wide cabin.

The designer's specifications and performance figures for the pusher are as follows:

| | |
|---|---|
| Span, ft. | 34 |
| Wing Area, sq. ft. | 120 |
| Wing Loading, lbs./sq. ft. | 11.7 |
| Gross Weight, lbs. | 1,400 |
| Empty Weight, lbs. | 850 |
| Useful Load, lbs. | 550 |
| Top Speed, mph. | Over 120 |
| Cruising Speed, mph. | Over 110 |
| Rate of Climb, fpm | Over 700 |
| Ceiling, ft. | Over 19,000 |
| Fuel Capacity, gals. | 23 |

Greenwood cites his firm's pusher problems and solutions as follows:

*Wing-Body Interference.* Stumbling block in many pusher developments is in attaining a reasonably high power-off maximum lift coefficient. But in the Model 14 the only part of the body projecting above the wing is the part that houses the flat engine and convergence is kept at a minimum. Below the wing, the body is highly tapered. At higher lift coefficients the flow is smooth with or without power. The cooling air intake ducts help fillet the wing-body intersection beneath the wing. The airfoil (NACA 4418) is least susceptible to wing-body interference.

*Balance.* A pusher's center of gravity has the same relation to the wing position as in a tractor, but a completely new location of major weight items is demanded. To obtain correct balance with minimum useful load, it is necessary for the weight empty c.g. to be as far forward as possible. The balance as worked out is from 16 per cent to 26 per cent of the mean aerodynamic chord in flight (this shift actually amounts to only 4.5 ins.) and weight empty position is such that there is a load of 40 lbs. on the nose gear. At full gross the load on the nose gear increases to only 200 lbs.

*Cooling.* In a tractor installation, the propeller forces air into the cowling for ground cooling. In the Model 14 pusher, a low-pressure area ahead of the propeller induces the cooling air flow, eliminating need for a blower. To accomplish this, the cooling exit area was located in the immediate vicinity of the propeller. To date no cooling troubles have been encountered during normal ground operations. Cooling air intake ducts are located below the wing leading edge and this installation has given excellent results under all flight conditions, according to Greenwood. Cooling air flows from the ducts into the lower engine and accessory compartment, upward through the cylinder baffles and then to the exit areas in front of the propeller.

*Soundproofing.* The common misconception is that with a pusher engine the noise is "left behind." This may be true at sonic and high speeds but is not much of a factor below them. Occupants of a pusher are also located nearer to the noise source than in a tractor. However, the pusher's advantage is that adequate soundproofing can be installed between the noise source and the occupants. This is not possible in the tractor because of windows between the noise source and the cabin. Upholstered seats are extremely effective in absorbing sound in the pusher. For the same weight of soundproofing material the pusher is substantially quieter.

### Weight Held Down

*Unconventional Structure.* To capitalize on maximum visibility, a keel beam is employed as the load-carrying member forward of the seat. Completely below the floor level, it permits a full-size, low-level door and large front and side windows with non-structural, narrow corner posts. Numerous structural innovations, most of them having been tried in the past on other airplanes, are used. Empty weight of the 14 is about the same as for similarly powered competitive designs and Greenwood cites this as a victory because of the 14's unorthodox design.

*Landing Gear.* Model 14's landing gear has a 12-in. stroke and is designed to land the airplane safely from a rate

*(Continued on page 21)*

## FLYING THE MOONEY

*(Continued from page 15)*

to reach the stall, but it finally came and the nose broke clean at 42 mph. IAS at 4,000 ft. Then we tried it with power off and the airplane stalled at 46 IAS. The stall was reached at 48 in a climbing turn. With power off and gear and flaps down the deceleration was more rapid, and the stall occurred at 42 mph. IAS without having the nose very high. Control pressures are very light in the Mooney.

After taking off from Marshall's Field in Dallas, where Mooney Distributor Jimmy Marshall loaned us his demonstrator for our trip, we trimmed for cruise at 5,000 ft. and headed for the first of three stops on a 180-mile rectangular trip we had charted on the map. Indicated air speed at that altitude turned out to be 105 mph. with 2,450 rpm. Our heading was 300 degrees and we had a 21-mph. wind from 180 degrees and reached our first stop after averaging 110 mph. block-to-block from take-off to completion of the landing at Denton, where Friend Pat Breen, the local operator, greeted our arrival. Being quite impressed with the Mooney, we had to demonstrate a quick take-off and fast climb for Pat, getting 1,500 ft. of altitude before we crossed the airport boundary.

On the second leg of our trip, we leveled off at 2,000 ft. and again set the throttle at 2,450 rpm. This gave us an IAS of 109 mph. From take-off at Denton to completion of our landing at Sherman, our second stop, we averaged a block-to-block speed of 113 mph. Our heading had been 41 degrees and we had a 19-mph. wind from 150 degrees. We topped it off with the "pause that refreshes" and slid into the cockpit for the third leg, levelling off at 2,000 ft. for Greenville on a heading of 130 degrees, virtually into the teeth of that 19-mph. headwind. This time, however, we selected a throttle setting of only 2,350 rpm., coming up with an IAS of 105 mph. At completion of the third landing, our block-to-block speed from the previous take-off turned out to be 100 mph.

For our final leg into home base, we climbed to 5,000 ft. at 80 mph. and settled down on a heading of 230 degrees with a 21-mph. wind blowing from 180. We used a throttle setting of 2,450 rpm., for an IAS of 105 mph. After landing, our block-to-block speed figured out to be 95 mph., slowed down not only by the wind but by a series of stalls which we performed.

Summing up later, we found that we had maintained an average block-to-block speed of 102 mph. for the 180-mile trip with three stops. We had consumed 8 gals. of gas for an average of 4.5 gals. per hr. or 22.5 miles per gallon. The Mooney we flew had a climbing propeller. Distributor Marshall reported a cruising propeller had given an economy of 3.2 gals. per hr. in the Mooney. Designer Al Mooney, who places the airplane's sea level economy cruise on one-half power at 115 mph., says its economy cruise is from 35 to 40 miles to the gallon of gas. That is real economy for fast transportation and is tops if you are a solo traveler. ★ ★ ★

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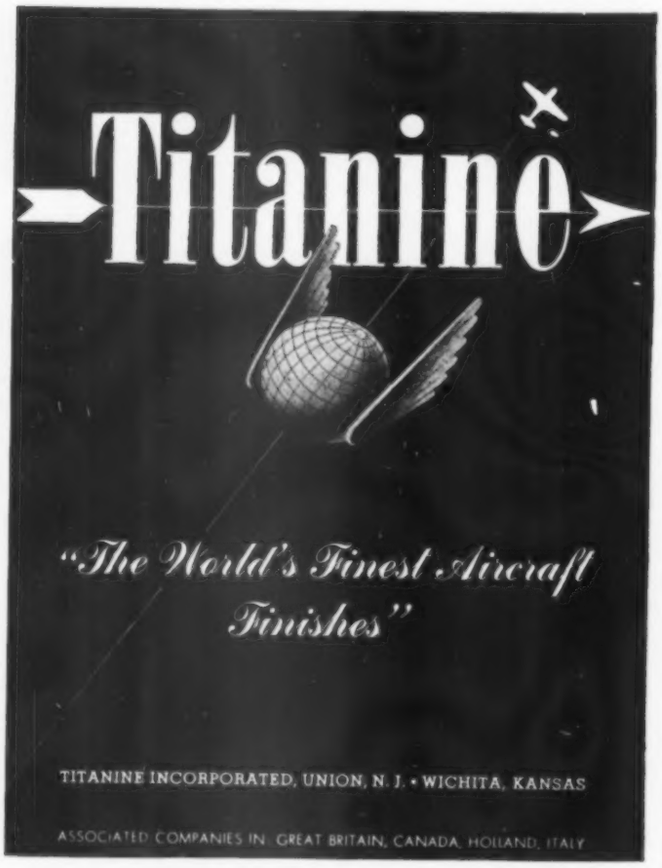
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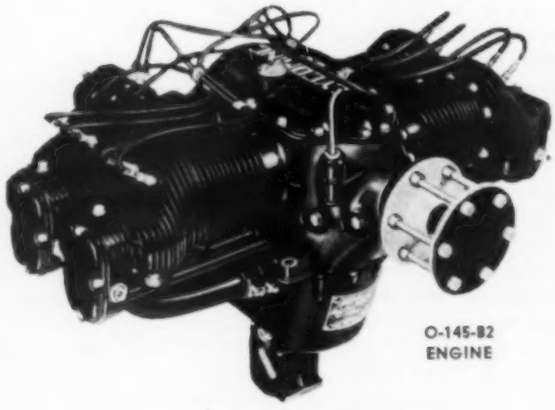

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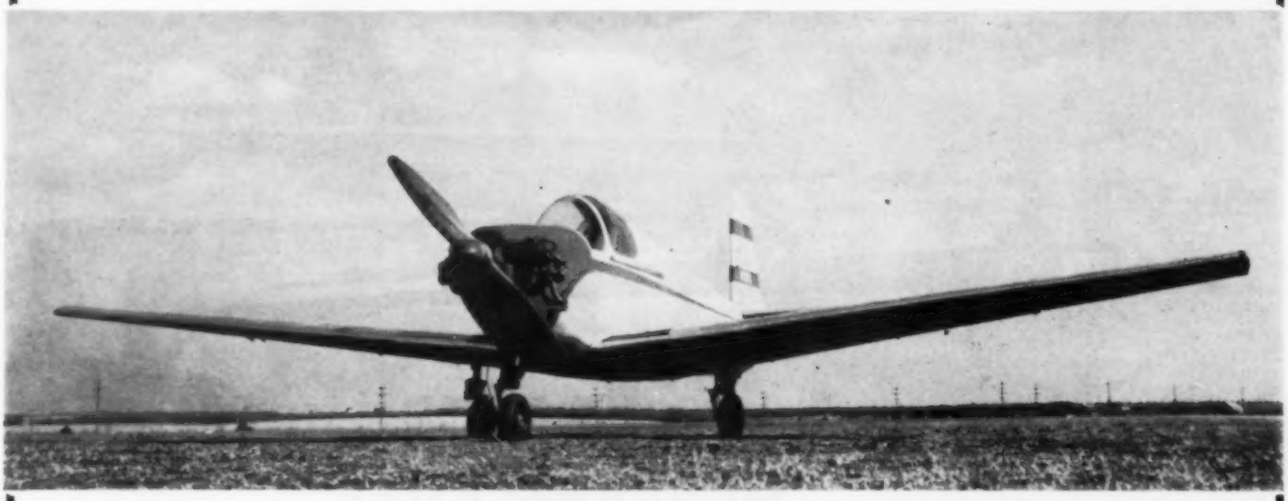

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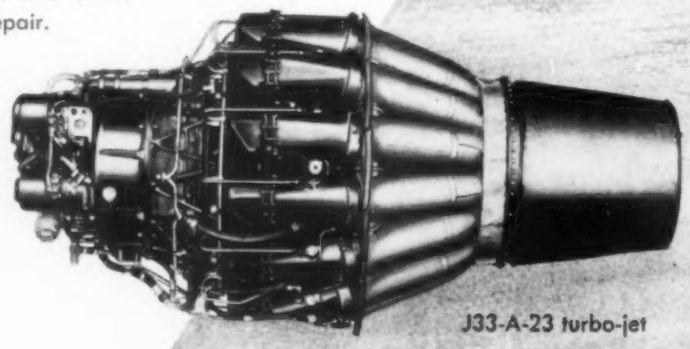
*Air Power is Peace Power*

★ ★ ★

Other Allison-powered airplanes:
Republic F-84 Thunderjet
North American FJ-1 Fury
Northrop YB-49 Flying Wing
Grumman F9F-3 Panther



J33-A-23 turbo-jet

Allison

*Builder of axial and centrifugal flow turbine engines*

DIVISION OF GM GENERAL MOTORS

Indianapolis, Indiana

## NEW DESIGN FEATURES

*(Continued from page 17)*

of descent of 15 ft. per sec. (900 ft. per min.), which is considerably in excess of CAA requirements. Says Greenwood: "This was originally conceived as an added factor of safety but, in addition, has worked out to give a soft landing."

Describing the pusher's visibility, Greenwood says its extreme vision over the nose gives the visual sensation of a rapid descent in a normal glide, while the use of flaps gives it an extremely steep approach.

Visibility was the major factor in the design philosophy.

"As an observation platform the 14 is in a class by itself, excluding rotary wing aircraft," says Greenwood. "Visibility is excellent in all directions except straight aft. Our studies have shown that vision is a basic factor that makes flying enjoyable. When we undertook the Model 14 design, we were doubtful that substantial improvements could be made in speed or in load-carrying ability for a small, low-cost, safe and easy-to-fly airplane. But we were convinced that definite improvements could be made in developing the small plane into a better and more comfortable observation platform while maintaining highest standards in speed and load-carrying.

"Flight tests have proved very gratifying. The cruising speed is definitely competitive and should be even better in production models. Load-carrying is also definitely competitive. But we have excelled the small airplane field with visibility. This makes the 14 ideally suited to various types of patrol and survey duties and in addition will be exceedingly valuable for dusting or spraying duties.

Greenwood and his associates prefer not to speculate on sales price of their pusher—if and when it is marketed. They are convinced of a receptive market following CAA certification but admit that costs are apt to be higher than those of conventional designs. The cabin compartment, or body, is obviously more difficult to manufacture, they say, than the conventional lightplane fuselage.

## AIR MEET

*(Continued from page 13)*

Severance of Stephens College became top woman pilot and Jerome Lobel of UCLA was top individual pilot. National Guard and Naval Reserve units staged flight demonstrations. A galaxy of trophies from manufacturers, suppliers and aviation trade publications went to winners. Industry, Air Forces, CAA, and CAP representatives assisted in officiating and airport operators and CAP loaned airplanes for students who did not bring their own. Participants were lodged in barracks on the airport during the meet, conducted at the former U. S. Marine air base on Eagle Mountain Lake near Fort Worth. ★★★


**Airport Manager and Operator**

Capable airport manager and fixed-base operator seeks desirable location for a complete operation consisting of 2 Cubs, 1 Luscombe, 1 Stinson, 1 Fairchild, and 1 Twin Cessna, maintenance shop and aerial spraying operation. Approved GI flight training school. Can offer charter service, flight instruction, sales, service and maintenance.

If your city or airport needs such an operator with the above service ability and equipment, please write or wire giving complete details.

**Southern Flight**

Box 750-A, Dallas, Texas



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PAC

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Aviation's Oldest and Largest Maintenance and Supply Company

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**SCOTT "OXYGEN COCKTAIL" BOTTLE**

Neat high pressure oxygen bottle with gauge and two outlets: one for 100 minute flow, one for emergency oxygen. For high safe flight over mountainous terrain. Less mask.

Regular $122.50 ..... **On Special $59.50**

**FLYING HANGARS**

Cover your airplane. For Cubs, T-Craft, Ercoupe, Aeronca, Culver, V. Swift 85.

Regular List $35.00 "Special" ..... **$9.95**

**NEW "SWITLIK" CHUTES**

Bill Odom Wore "Switlik" On His Record Flight

| | Not Surplus | Not Second Hand | Not Army |
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| Quick Att. Back 24' List $123.00 | | | $46.13 |
| Quick Det. Back 28' List $163.00 | | | $59.95 |
| Quick Det. Seat 24' List $129.00 | | | $48.38 |
| Fixed Seat 24' List $129.00 | | | $48.38 |
| Fixed Back 28' List $163.00 | | | $59.95 |

**INSPECTION HOLE COVERS**

Health inspection hole covers. Regular 25c each. Special Sale Price in dozen lots. Each ..... **$0.13**

**NYLON SCARFS**

Beautiful "Lucky" pilots scarfs with neatly sewn hem. Large 14" x 16". Were $3.00, now ..... **$1.49 each**

"BRANCHES COAST TO COAST"

**SAFETY WIRE SALE**

21 gauge brass 5 lb. spool. Was $5.00 spool. Sale price $1.95 spool. 16 gauge brass Cad. plated ½ lb. spools. Was $1.00 spool. Sale price, spool ..... **$0.23**

**SUMMERTIME "SUN GLASSES" SALE**

Optically ground lenses, highly polishes, sturdy plastic frames. Regular price $1.95. Sale price ..... **$0.49**

No. 525 Air Corps Style with plastic sweatbar. Green lenses polished and ground. Gold filled frames. Regular $4.95. Sale price ..... **$1.95**

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Regular $1.60 list. Special sale per yd. ..... **$0.79**

Minimum order of 500 yds., per yd. ..... **.74**
(FOB Kansas City Branch)

Minimum order of 1000 yds., per yd. ..... **.69**
(FOB Kansas City Branch)

**PILOTS' FIRST AID KIT**

PA-5 Kit with scissors, tweezers, cotton bandage, band-aids, iodine, etc. Packaged in nice metal case 7½"x4½"x1¾". Regular $2.00. Sale price, each ..... **$1.13**

**All of these items quoted f.o.b. P.A.C. Warehouse, Burbank, Calif., and should be ordered through your nearest P.A.C. Branch. Include state tax with order. Everything listed is in limited quantities and subject to prior sale.**

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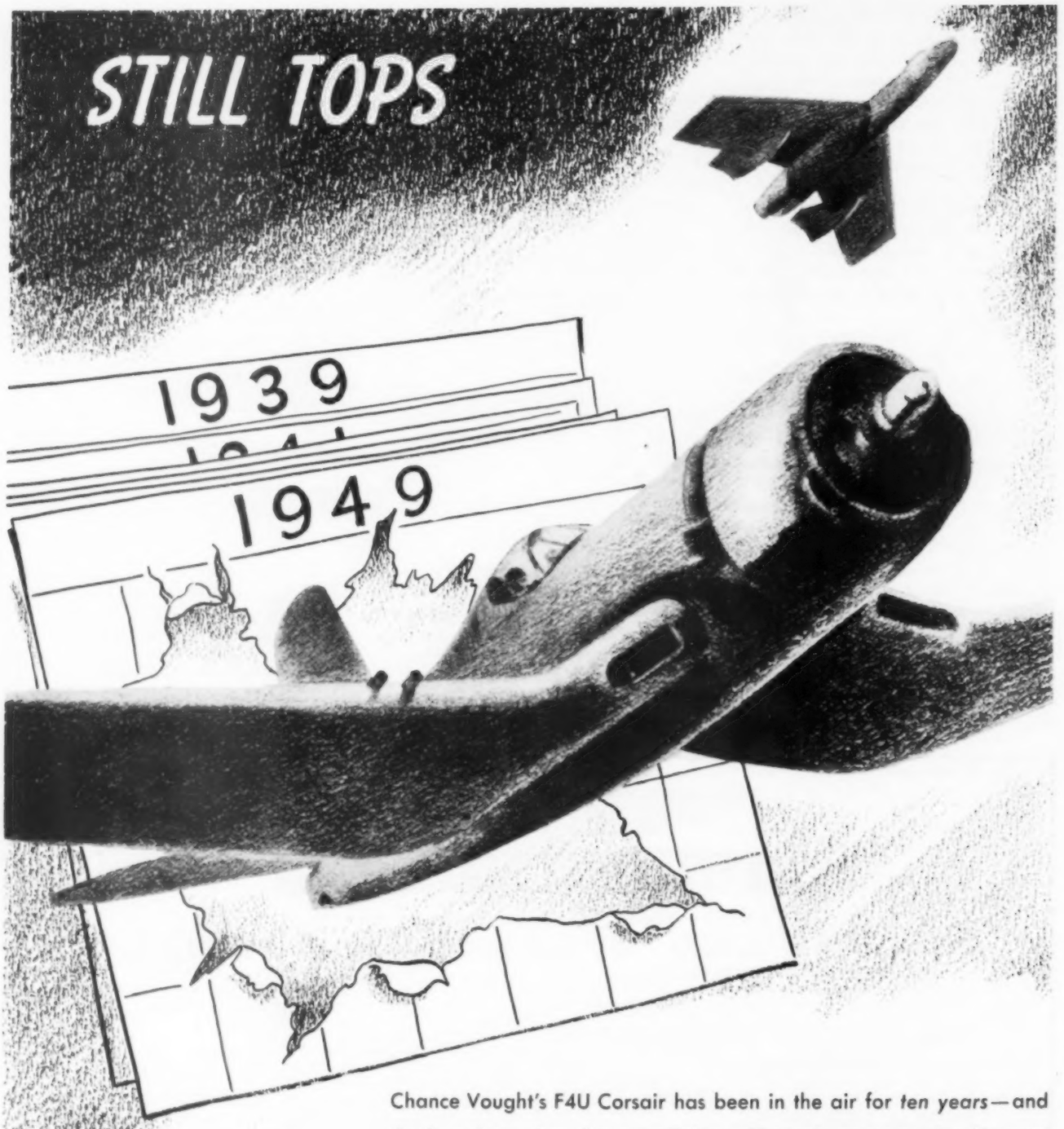
| STanley 7-2781 | Atwater 6300 | Linden 2-8000 | Main 754 | Lander 4311 | Lockhaven 8-5424 |

# STILL TOPS




Chance Vought's F4U Corsair has been in the air for *ten years*—and that's a long time for any fighter. Through constant development and refinement it remains today the Navy's top fighter-bomber.

Such a record is a tribute to the sound research, engineering and development that goes into every airplane built by Chance Vought Aircraft. The latest—the XF7U Cutlass—gives promise of being another "tops" for the U. S. Navy.

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DALLAS, TEXAS

ONE OF THE FOUR DIVISIONS OF UNITED AIRCRAFT CORPORATION

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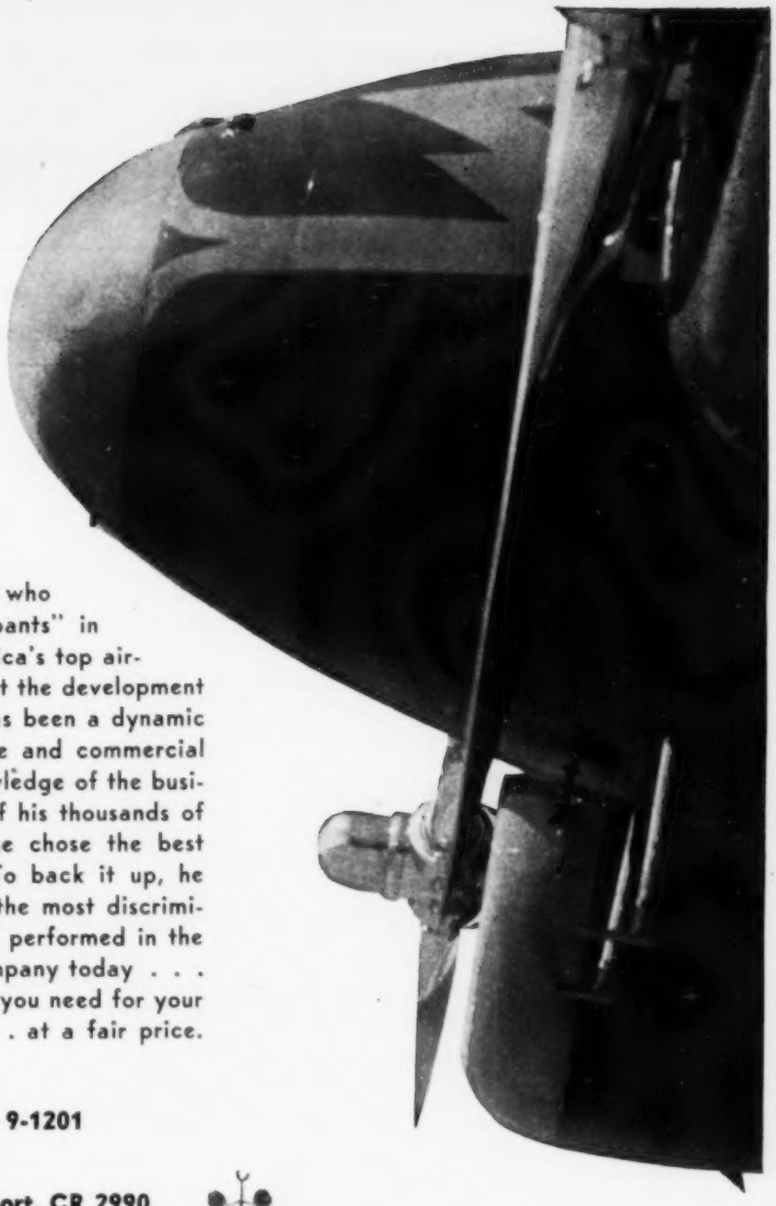
# SAFELY

## in the AIR

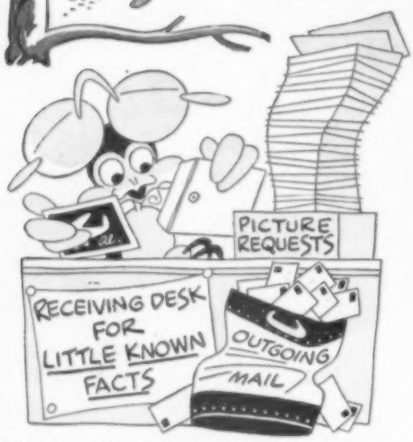


It's no stroke of luck that J. D. Reed, who learned to fly by the "seat of his pants" in 1927, today owns and operates America's top aircraft sales and service. More than just the development of a private enterprise, J. D. Reed has been a dynamic force for the advancement of private and commercial aviation through his hard-earned knowledge of the business . . . through his fair treatment of his thousands of satisfied patrons. For distribution, he chose the best product in the air, BEECHCRAFT. To back it up, he built a service to match every need the most discriminating owner or pilot could want . . . performed in the style they want it. At J. D. Reed Company today . . . and always . . . you can get whatever you need for your aircraft, when and as you want it . . . at a fair price.

**HOUSTON — Municipal Airport, Wy 9-1201**
**DALLAS — Love Field, Dixon 4-2791**
**NEW ORLEANS — New Orleans Airport, CR 2990**

# The Birdmen's Perch

By *Major Al Williams*, ALIAS, "TATTERED WING TIPS,"
Manager—Gulf Aviation Department, Gulf Bldg., Pittsburgh 30, Pa.




They're still scrapping about those two de luxe private planes.

Champions of the two similar-but-different 4-place, $10,000 class planes got to snarling at each other about take-off run, landing characteristics, climbing speed, etc. So they set up a contest at Albuquerque (altitude: 5365′) to prove which was the better plane.

One plane took off (no load but pilot and full tanks) in 330′ . . . landed in 348′ over a 7′ obstacle. The other got off in 395′ . . . got back in 402′ over the obstacle. The latter plane had about 3 miles more wind, according to the tower.

But all over the country, every owner or pilot of these two types of planes is screeching why the test was (or wasn't) a fair one. And offering to prove it!

Of course, arguments like this one are one of the most delightful parts of this flying business.

But even more delightful is comparing *either* of these airplanes to planes in the same class 10 or 15 years ago!

Yessir, this is a swift business!

## REPORT CARD

Been getting more reports from operators and owners around the country on Gulfpride Aviation Oil—Series D.

They tell us that this great new oil for horizontally opposed engines has helped them boost overhaul periods to over 1000 hours!

They say the detergent qualities of Gulfpride Aviation Oil—Series D—practically eliminate stuck rings and valves.

They've found that the dispersent characteristics let them use Series D in clean or dirty engines . . . that foreign matter in the engine stays in suspension in the oil until it is drained off at changes.

And sure enough . . . just like we've

said for years . . . they've discovered that Gulf's exclusive Alchlor Process gets more of the non-lubricants, more of the impurities out of Gulfpride Aviation—Series D—giving them more honest lubrication per quart of oil!

It's the world's finest oil for horizontally opposed engines.

Better use it.

## LITTLE KNOWN FACTS DEPT.

Lt. Comdr. Sheldon Kinney, Naval Base, South Carolina: *Thank you for your Fact. Now if you'll send proof, we can use it.*

J. R. Crandall, Springport, Indiana: *Ditto above.*

Roy E. Kelly, Chief Technician, Treasury Law Enforcement Agencies, Bethesda, Md.: Thank you for an interesting Little Known Fact. Thanks for the proof, too. Your Commission as Perch Pilot (bottom rung) is on the way for:

*"In 45 hours 15 minutes flight time, a Coast Guard piloted L5 recently smoked out 142 moonshine stills in a single state, involving $60,000 in tax frauds, plus much more in fines and penalties!"*

That's all there is to it, gents. One Little Known Fact plus one proof of same equals one Commission as Perch Pilot (br). Five of 'em get you promoted to Senior Perch Pilot.

And 20 of 'em (gasp) make you a Command Pilot!

The address is up on top there.

**Gulf Oil Corporation and Gulf Refining Company . . . makers of**

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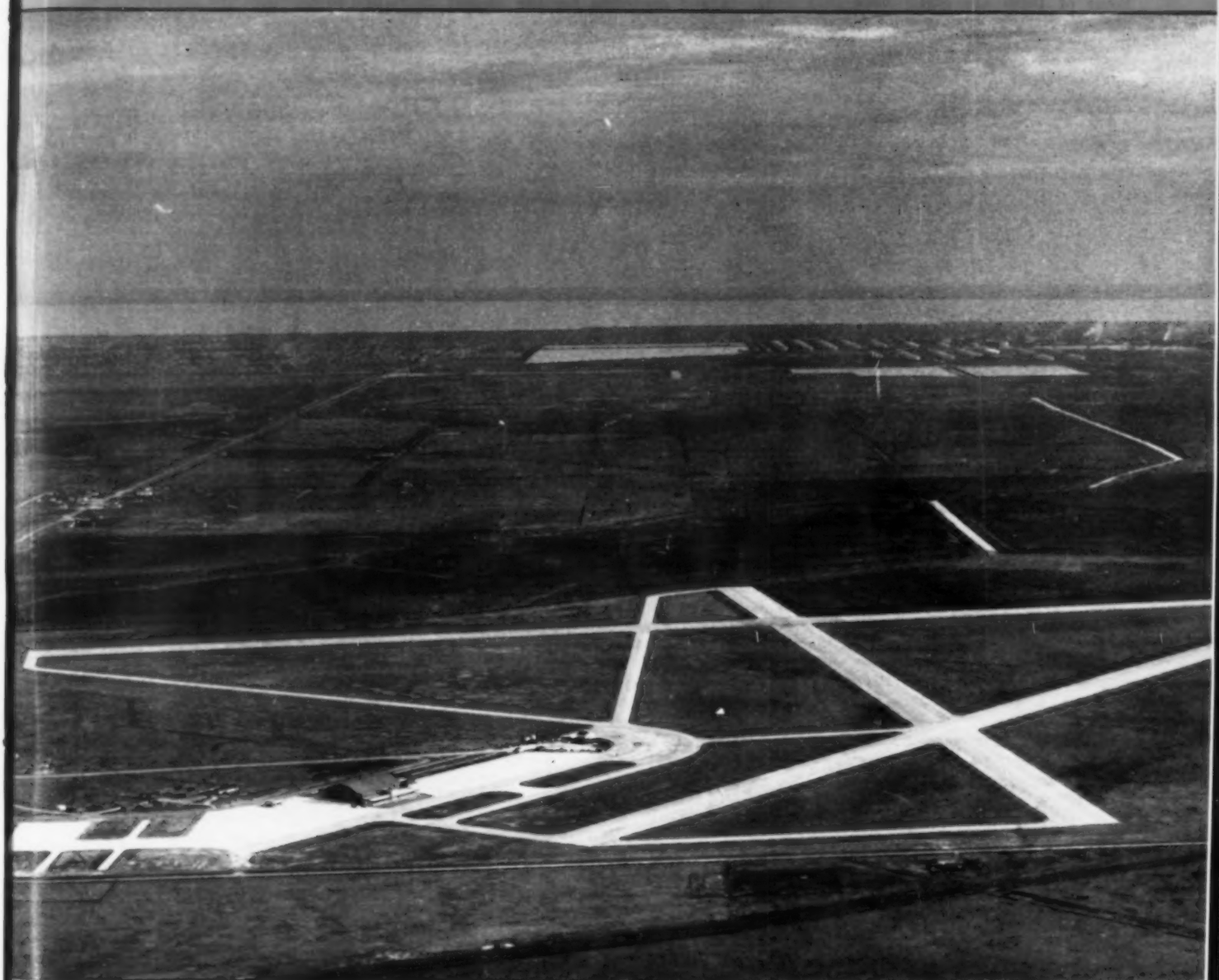
DON'T TRY TO DO YOUR OWN CARBURETOR REPAIRS UNLESS YOU HAVE . . . .
THE SPECIAL FACILITIES AND SKILLS NEEDED. CARBS ARE DELICATE . . .
KOFF!
AND IF YOU FOOL AROUND WITH THEM, YOU'RE APT TO GET AN ENGINE CUT-OUT . . .
SPUT!
. . . OR TO WASTE SOME PRECIOUS GULF AVIATION GASOLINE
GULF

VOL. XI, NO. 4 JUNE, 1949

# Modern AIRPORTS



**THIS MONTH'S MODERN AIRPORT** is the Class IV Jefferson County Airport, 9.0 miles southeast of Beaumont, Texas. It features a "private pilots' building" and is managed by Wayne Parks. Used by blimps on anti-submarine patrol in military service during the war, it has a 140 by 162-ft. hangar obtained from another surplus field and re-erected; a temporary airline terminal converted from a former night club, and is being improved with Federal-aid grant of $209,147. Paved runways are 5,000 by 150 ft. Apron at lower left in photo will be utilized by T hangars. Over 30 private planes are based there and airline service is by Eastern Chicago & Southern and Trans-Texas. Port Arthur is seen in the background.
—(CAA Photo by Norman Simmons.)

## In This Issue

A Key to Airport Survival—
By George E. Haddaway . . . 26

Questions and Answers
for Airport Operators . . . . 27

# A Key to Airport Survival

## Unless we preserve existing airports it does little good to build new ones.

## CAA management consultants are of vital importance in perpetuating airports.

By GEORGE E. HADDAWAY

NO one in industry or government aviation circles can continue to shut their eyes to the alarming number of airports which are being abandoned at a terrific rate. Some of them are going back into pasture or farm land, others are being developed into housing areas while still others are abandoned and left to grow up in weeds. It's high time we should make every effort to arrest this tragic trend and salvage as many as possible. Something must be done to solve the enigma of building new airports under the national airport plan while so many established airports are closing up.

It is not an easy task. The economic pinch is on every phase of commercial aviation.

The easiest way out is to ignore the problem entirely or assume that nothing can be done to help perpetuate existing airports. Fortunately, the industry has a small but effective agency within the Civil Aeronautics Administration which can and is being employed to help keep airports on a going-concern basis although the agency is not charged specifically with that responsibility. We refer to the airport management consultants in the CAA office of airports. The small staff in Washington under the direction of William G. Fuller, a veteran airport manager of more than twenty years experience, is backed up in the field by two airport management consultants in each region. This slim handful of men for the past three years has been engaged in providing counsel, advice and effective assistance to airport owners and operators, mayors, city managers, city councils, commissions, boards, airport users and airport managers. Yet they are now in danger of being eliminated.

It is surprising how few people intimately connected with commercial aviation understand or appreciate the work of these consultants. For an idea of the variety of jobs they attend to here's a partial list of activities involved in advising representatives of owning agencies on completely new airports: (1) Assist in setting up the right kind of management group or individual; (2) provide the basic outline for rules and regulations which make the airport usable and safe; (3) make arrangements for services and operations that are inherently necessary to create a going-concern airport; (4) assist in finding means and types of revenue to offset expenses; (5) advise on reasonable leases, agreements and contracts for the airport and its users; (6) provide data to determine most reasonable type and size of buildings necessary to house all activities; (7) caution and warn against pitfalls which may cause future difficulties with users or with the Federal government under sponsor agreements; (8) promote and encourage community use and enjoyment of the airport; (9) assist tenants and users with service and selling ideas which have been used successfully at other airports; (10) enlighten governing agencies of airports as to the danger of discriminatory or exclusive rights practices; (11) provide continuous evaluation of all factors affecting the welfare of the airport after it is established so that it will be of maximum use to the community; and (12) act as a source of information on methods, plans of operation, facts and statistics upon which a community can draw for properly operating their airport on the basis of experiences of others and tried and proven practices.

The official job description of these hard working airport management consultants does not list the above responsibilities as official duties. Rather, it is a list we gathered on our own from actual field experiences of these men. While it was never contemplated by their job sheets, we have seen many instances where the consultants poured oil on troubled waters and through patient working with city fathers have actually kept airports from closing up and managed to get bad situations ironed out and airports back on the beam. We have seen cases in which owning agencies were putting the bite on a tenant-operator to such an extent that his financial security was threatened. It required the adroit action of an airport management consultant to step in by invitation and achieve a reasonable compromise which permitted the operator to survive, the public to be served and the airport to remain open. We are all too familiar with the number of airports growing up in weeds because of owning agencies demanding the last pound of flesh from the struggling operator. Rarely has he ever had a friend in court.

Perhaps one of the greatest difficulties within our entire domestic airport structure is the lack of dependable statistical and factual information so classified and prepared that it could provide concrete assistance in formulating specific operating practices for specific airport conditions. What the city of Milwaukee does on its municipal airport might not apply at Reno, Nevada. But Reno might well adopt some of the practices, formulas or policies followed at Waterloo, Iowa, or Montgomery, Alabama. Right now the airport management consultants are engaged in a nation-wide airport survey by each CAA region, never before attempted. The analysis of airports rates and charges and of income and expense alone will be worth untold millions of dollars to the preservation of our airport system. From this financial information it will be possible to find out what practices are working in what kind of airport. Perhaps some semblance of uniformity and standardization will result from the study. But it will require the services of the CAA management consultants not only to collect but also to disseminate this information and get it applied when it becomes available. Such organizations as the National Association of State Aviation officials, the American Association of Airport Executives and the Airport Operators Council can help. But the real nucleus for the task will be the agency now compiling the information.

If the cities, counties, fixed-base operators and individuals owning airports cannot find wise counsel, advice and help in operating and maintaining their airports the present deterioration of existing airports is bound to reach a point where even greater funds will be required to fill up the gaps in our national airport structure than have been contemplated heretofore. To conclude that in order to reach the national airport goal commensurate with the best offical thinking among military men, congressmen and aviation experts, all we must do is just build airports is as ridiculous and fallacious as building airplanes and not teaching people how to fly them. Until our elected officials come to realize that the perpetuation of existing airports is as important as building new ones the future of aeronautical progress in this nation is dark and

insecure. Good management is vital.

There is some talk that an Airport Advisory Committee similar to the Administrator's Non-Scheduled Flying Advisory Committee will be established to meet twice a year in Washington. It is an excellent idea. We sincerely hope that if such an advisory committee is formed they will see to it that the work of the management consultants is not only preserved but that it is implemented and strengthened as the conditions warrant. ★ ★ ★

## AIR REPORT

(*Continued from page* 4)

planes, flying J. D. Reed's $75,000 Mustang, the "Beguine." For those who fly in, ETA races and closed-course races for Cubs, Aeroncas, Ercoupes and small Cessnas. All participants must arrive by 6 p. m., July 2. Entries must be filed by midnight, June 15. Plenty of entertainment is promised. Get up a flight party at your airport and head for Houston on July 2.

**AIR FREIGHT CERTIFICATES** awarded to four carriers for five years will establish a vital new industry, with CAB estimating a potential of one billion ton-miles annually. Certificates went to Slick, Flying Tiger Line, U. S. Airlines and Airnews. . . . **FAIRCHILD SPARE PARTS BUSINESS** has been sold to Arkwin Corp., Strother Field, Winfield, Kansas, as result of Fairchild going out of personal planes business. . . . **JAKE MILLER** has rejoined Piper as domestic sales manager. . . . **CHEAP WEEKEND IN MEXICO** is possible for flight parties, due to recent drop in value of the peso, worth 8.50 to the dollar recently with signs of dropping farther. Top hotel rates are only 30 to 40 pesos per day, with many modest hotels charging less. TPFA members had a big time with the devalued pesos on their recent flight party to Monterrey. . . . **ART CHESTER,** long-time racing plane designer and pilot, lost his life in a recent midget race on the West Coast. . . . **PAUL E. RICHTER,** a founder of TWA and until recently president of TACA, died suddenly last month in California.

**SIMPLIFIED FEDERAL-AID AIRPORT** regulations have been announced by CAA to eliminate 5 of 12 forms which sponsors must fill out and to brief two others. Also, limit on payment of grants to sponsors before final audit has been raised from 85 to 90 per cent and in early stages of processing a project the sponsor is relieved of having to submit detailed title evidence, itemized cost estimates, survey maps and abstracts of bids. Contracts under $2,000 are allowed without competitive bidding. . . . **RFC FINANCING OF HANGARS, TERMINALS AND OTHER BUILDINGS** on airports was urged in a resolution adopted at the recent Oke City convention of the American Association of Airport Executives. Also urged was federal operation of airport control towers as an integral part of the federal airways. Complete proceedings of the convention, including speeches containing useful airport management information, may be purchased from Leigh Fisher & Associates, 7337 Churchill Ave., Detroit 6, Mich., at $2.25 per copy. AAAE officers elected at the convention are: Don W. Martin, Wilmington, Del., president, succeeding Douglas O. Langstaff, New Orleans; Pat Moore, Ft. Worth, first vice president; Cecil Meadows, Bakersfield, Calif., second vice president; W. E. Betsworth, Waterloo, Iowa, third vice president; M. H. Nuss, Reading, Pa., secretary-treasurer. Honorary memberships were awarded Rep. Carl Hinshaw; Leigh Fisher, airport consultant, and George E. Haddaway, SF editor and publisher. . . . **NEWLY-ELECTED OFFICERS OF THE AIRPORT COUNCIL** are: B. M. Doolin, San Francisco, president; A. B. Curry, Miami, and C. J. Lowen, Denver, vice presidents; J. Victor Dallin of Philadelphia, Hervey Law of New York and John Berry of Cleveland, directors; Cyril C. Thompson, executive secretary, and Leander I. Shelley, general counsel. ★ ★ ★

# Questions and Answers For Airport Operators

### Small-Town Operator's Minimum Needs

**QUESTION: We have a new airport basing about seven locally-owned aircraft. However, we do not have an operator. The city officials have asked me if I would be willing to assume the responsibility for operating the airport and the small hangar under an operator-manager agreement. I have a business of my own but I have been interested in something of this kind since I have an A. & E. license and a private certificate. But I am not in a position to invest very much capital. The city's present difficulty appears to be that they have been unable to get anyone interested in starting operations in a town of our size, probably due to the experiences of some operators during the last few months. Can you tell me if it would be possible and reasonable for me to attempt to start operations without tying up too much money?**

ANSWER: Your problem is not an uncommon one in smaller communities. We feel that it would be possible for you to start operations without investing too much capital since there is already a hangar. It is necessary to provide service in the way of aviation fuels and lubricants, and you should see your local gasoline dealer about storage and dispensing facilities. If you can make a reasonable lease with your community which doesn't require a high fixed rental expense, then for a minimum operation you need only one additional thing—a telephone.

In order, however, to supply the various services which the community has a reason to expect from a fixed-base operator, such as training, charter operations and aircraft sales, it is felt that you might very reasonably explore some such arrangement as this. If you can find an operator in a nearby town of larger size who is willing to arrange to supply you as needed an aircraft and instructor for any flight training sales which you may build up, this would save the expense of capital investment in an aircraft and the salary of an instructor. It might be possible to do this on a basis of a percentage commission. Charter

(*Continued on page* 30)

*Flight Parties* . . . **This year plan to get more usefulness from your airplane in business and social activities. You can do both at the friendly Flying L Ranch. Wherever you are, the Flying L is only hours away in your plane, awaiting your arrival with superb facilities and service. Everything as you want it . . . hard-surfaced runways . . . service to earn your satisfaction and confidence . . . distinctive, cozy-comfort guest suites just across the turf . . . swimming pool . . . horseback riding . . . fishing in stocked lakes . . . hunting . . . appetizing food around the clock . . . night-time fun-fare.**

**¶ Make your flight plans now — next trip visit the Flying L Ranch, 32 miles West of San Antonio at Bandera.**

**Col. and Mrs. Jack Lapham, Owners**

## SMALL AIRLINES

*(Continued from page 11)*

case of civil operators, is the smallest production multi-engine transport and it is a 12-yr.-old design, excellent for some purposes but obviously less efficient than a modern Beech design would be if the civil or military demand justified the development costs involved.

Now that dependable feeder airline operating statistics and experience have been acquired, a re-appraisal of design requirements is essential. But the few successful DC-3 operators cannot underwrite development costs, those who have operated feeder certificates at losses are unable to finance new design studies, certificate holders who have not begun operations are finding it more difficult than ever to scratch up enough funds to establish their systems and the military has evidenced no interest in small multi-engine designs for short-haul transport. The solution could be found in the use of excellent postwar single-engine planes already developed and proved dependable by private purchasers and operations on a large scale. Their local service, economies and earnings would in turn create both the market and the financing for new multi-engine developments.

Interest among manufacturers in the small airline outlook is slowly being roused. Their active participation in the problems of local air service is essential. On the other hand, many fixed-base operators and aircraft distributors and dealers are becoming interested. A growing number of applications for certificates is expected during the coming months.

In view of this, the authors have prepared interesting studies which will be presented in SOUTHERN FLIGHT next month, designed to provide useful information on the establishment and operation of small airlines and their position in the nation's air service system.

(EDITOR'S NOTE: *Messrs. Pickering and Wemple are well qualified to discuss local air service development. They are airline consultants. The former has represented numerous applicants before the CAB, one of whom recently was certificated in the significant Air Freight Case and one of whom is an applicant for postwar single-engine airline certification. The latter has long experience in single-engine operations, including early-day air mail and air passenger lines, which he was instrumental in establishing both administratively and as a pioneer line pilot. He has recently served in an advisory capacity in establishing a scheduled intra-state airline in Texas using single-engine airplanes and an applicant for CAB certification on an interstate route.*)

## JUST AMONG OURSELVES

*(Continued from page 8)*

The hour so many people in the personal aircraft field have feared — the time when general business conditions would start to sag — has arrived. But it is interesting to note that the old-timers in the business are quick to admit it's simply a case of returning to normal conditions — a paucity of prospects and tough trades. There is a feeling too among the veteran FBO's that the watching-waiting attitude of business men never seems to last long in times like these and the wind could easily blow more favorably in a matter of weeks.

But they aren't kidding themselves or shutting their eyes to the true conditions—tough times are here and only the rugged are apt to survive. The one bright spot in the personal aircraft field is in parts, service and overhaul work, reflecting the healthy postwar use of many new airplanes in business and industry. Accessory and miscellaneous equipment sales are maintaining favorable levels, especially among those companies who have salesmen out beating the bushes. All of which proves that sales effort and integrated service pay off in this business, even when the bottom seems to have dropped out of the market. There are still good, business-like and realistic fixed-base operators and airplane dealers who can always make a living and produce profits, even during depressions.


**Service Satisfaction Is Assured at the following . . .**

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AUTHORIZED SERVICE STATIONS

**AMARILLO AIRCRAFT**
Tradewind Airport — AMARILLO, TEXAS

**ATLANTIC AVIATION SERVICE**
New Castle County Airport
WILMINGTON, DELAWARE

**BUTLER COMPANY**
Aviation Division
Municipal Airport — CHICAGO, ILL.
Drew Field — TAMPA, FLORIDA

**BUTTE AERO SALES & SERVICE, Inc.**
Municipal Airport — BUTTE, MONTANA

**HARTE FLYING SERVICE**
Municipal Airport — WICHITA, KANSAS

**LONGHORN AIRCRAFT CORP.**
504 Driscoll Bldg., Corpus Christi, Texas
(Branch Office) Hangar 602
Stinson Field — SAN ANTONIO, TEXAS

**Parks Aircraft Sales & Service, Inc.**
Port Columbus — COLUMBUS, OHIO
Municipal Airport — KANSAS CITY, MISSOURI
Palwaukee Airport (Wheeling, Ill.) — CHICAGO

**G. E. PENN**
Gregg County Airport — LONGVIEW, TEXAS

**J. D. REED CO., Inc.**
Municipal Airport — HOUSTON, TEXAS
Love Field — DALLAS, TEXAS
New Orleans Airport — NEW ORLEANS, LA.

**Roscoe Turner Aeronautical Corp.**
Municipal Airport — INDIANAPOLIS, IND.

**SOUTHWEST AIRMOTIVE**
Love Field — DALLAS, TEXAS

**SOUTHWEST AVIATION SERVICE, Inc.**
Hangar 2, Municipal Airport
OKLAHOMA CITY, OKLAHOMA

**TULSAIR DISTRIBUTORS, Inc.**
Hangar 5, Municipal Airport
TULSA, OKLAHOMA

# Certified Beechcraft Service MEANS . . . . .

## *"The Little Things that Count"---*

When you do business with a certified Beechcraft service station, you are doing business with the cream of the industry. These are operators to whom you and your passengers are important as PERSONS, as well as dollars-and-cents-paying customers. Before you have ever spent a dime, you're met by attendants anxious to roll out the Welcome Mat. They'll help you with luggage, tie-down, and local information. They'll swab off that dirty windshield, sweep off that dusty seat cover, and show a real, personal interest in your own personal problems. These and many more are the vital "LITTLE THINGS THAT COUNT." They're a part and parcel of CERTIFIED BEECHCRAFT SERVICE.

Insist on Certified Service at Certified Beechcraft Service Stations
You will find proof of capable and sincere service
by the number of Beechcrafts on the ramp

## QUESTIONS AND ANSWERS

(*Continued from page 27*)

flights in your community may be few and would not warrant your owning an aircraft suitable for charter. This, however, does not prevent you from offering charter service if you can make a similar arrangement with an operator elsewhere to handle your charter business on a commission basis. Flying in the aircraft only when needed, demonstration of aircraft for sale can be handled in the same way.

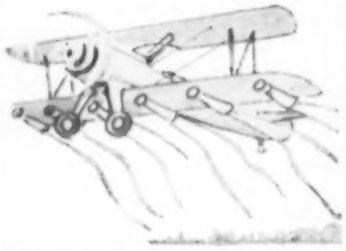
We believe this has merit in providing a well-rounded service and helps not only the local small-town operator but tends to increase the business of the operator in a larger community who can provide these types of service. It is our belief that many of the small-town operations which have struggled along bearing a heavy capital cost could be handled in such a way and tend to create a more general fixed-base operation system than for every operator to try to supply from his own equipment and manpower all the services that make a diversified operation. Major repairs may even be handled in a like fashion if you are not equipped to do that. One of the greatest enemies of reasonable costs is ownership of equipment whose hours of use are limited by limited demand.

### On the Wrong Track

**QUESTION: I have recently moved to this town and am seeking to establish a small fixed-base operation. The city owns an airport and has made an agreement with a local operator, the only one on the field, to operate and maintain the airport as an operator-manager. He doesn't pay the city any money. Now that I'm trying to operate on the field, the city advises me that it will be necessary for me to pay rental for some land on which to build a hangar and for use of the field. Why should they expect me to do this if the present operator-manager makes no payment?**

ANSWER: If it is your belief that the present operator-manager is getting the use of the field free, we think you may be mistaken in your views. If he has the obligation to maintain, operate and manage the field, and if he is actually doing that, then his use of the field is not free for the simple reason that the maintenance of the field requires the expenditure of time and money for materials in most cases, the management requires the expenditure of time, and the operation of the field may have caused him to spend money for capital investment as well as a considerable amount of his time. The fact that he pays no money doesn't mean that he does not have costs for which he gets to use the field. These costs are difficult to measure but they actually exist. His own time as used for these three purposes of management, operations and maintenance represent a cost to him that is measurable. You haven't stated what charges the city wishes you to pay. If they represent an amount in proportion to what the present operator-manager pays in time and expense, then they would seem to be reasonable. Of course, the extent of your operation should be measured against the extent of his to find the right proportion. Some cities are making agreements of the type that exists in your town and measuring the value of the manager-operator's costs so that subsequent operators may have a guide when they negotiate their own charges. ★★


**"100% Kill . . . No Plugging or Trails"**



High praise for Burnum Venturi Spray Systems comes from E. P. Stubblefield, Vice President, Rainbow Dusters, Inc., Los Animas, Colorado, as follows: "We have found our Burnum Venturi Spray unit more than met our expectations. We had 100% kill using DDT and Clorodane. With Clorodane we have had good grasshopper control. 2,4-D on wheat and corn is also sure-fire for weed spray with this unit. Maintenance is minimum with no plugging or trails. We sincerely recommend the Burnum Venturi Spray System."

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You, too, can do the job better with our units, available in handy kit form, fully-approved by CAA. We also stock Stearmans modified into combination duster-sprayers. Send for particulars today.

**10** *Exclusive Features*

1. Cockpit control in flight for start-stop and metering up to 50 gals./min.
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3. Perfect droplets at all times, eliminating fogging.
4. Patented dispensing valves eliminate nozzles and are self-cleaning, non-clogging.
5. 102-gal. fuselage tank slides in and out for passenger or other use.
6. All parts installed and operated without structural changes.
7. Light weight. System weighs less than seat, panel, etc., which are removed.
8. Shipped in complete kits with all parts, fittings, instructions.
9. Fully approved by CAA and in use in many states and Mexico.
10. Easily installed by two A. & E. mechanics in only 2 days.

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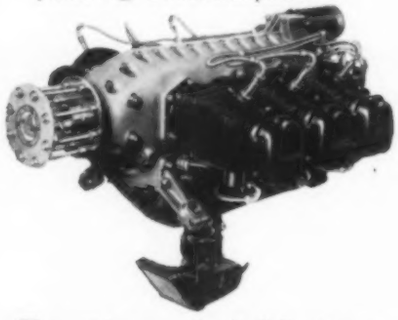
Engine stamina played a major role in setting this new record. And the safety, economy and dependability resulting from that stamina are available to you, for your everyday flight, in a wide variety of personal and executive planes with Continental power.



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## AUTOMATIC PROPELLER CONTROL

*(Continued from page 12)*

throttle. The pilot is concerned only with the propeller speed knob for operation of the APC.

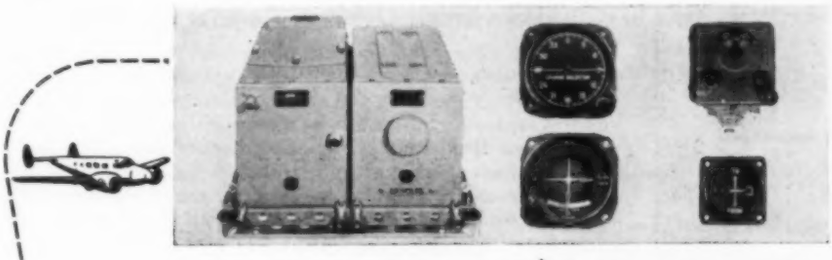
The APC signals to maintain constant speed through pitch changes are similar to those set in by the pilot when operating the propeller with the manual switch. The APC, however, can sense the need for pitch changes far more rapidly and can make the corrections far more accurately than is possible by manual operation even if the pilot had no other duties than control of the propeller. In addition, anticipation is designed into the APC such that the proper amount of pitch correction will be given to the propeller motor at all times to prevent "overshoot" which would result from excessive correction signals.

In order to study the method of control exercised by the APC to maintain constant engine speed let's make a typical flight from the time of engine run-up to final landing:

For take-off the propeller speed knob is turned to the take-off stop. On a short field take-off the brakes are held while the throttle is advanced slowly, and the brakes are released when the engine has accelerated to full power output. The tachometer will then indicate 2,300 rpm. The brakes are then released, and the plane picks up air speed. With the blades in full flat pitch the engine will try to over-rev. The APC, however, detects this overspeed before it has developed more than 25 rpm. and will send a signal to the pitch motor to increase the pitch angle of the blades. The engine is then loaded by the steeper blade angle and maintains its proper rated rpm. As the plane continues to pick up air speed this procedure is repeated a number of times, the APC increasing automatically the pitch of the blades to maintain constant rpm. for rated power. Due to the use of rated power, take-off distance is decreased approximately 25 per cent.

After a climb has been established and take-off power is no longer required, the propeller speed knob is turned to the left about one-fourth turn until the climb detent on the knob is felt. This detent is used so that climb rpm. can be set without reference to the tachometer.

The tachometer indicates the engine slowing down from 2,300 to 2,050, which is recommended rpm. for climb. When the propeller speed knob is turned from take-off to the climb position, new conditions are established in the APC unit, since it has now been ordered to maintain 2,050 instead of

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***Airborne Equipment for:***
**OMNI-DIRECTIONAL RANGES**
**RUNWAY LOCALIZERS**
**VISUAL-AURAL RANGES**
**SIMULTANEOUS VOICE**
**GCA VOICE RECEPTION**

**The Type 15B VHF Navigational Receiving Equipment** (illustrated) provides for reception on the new Omni-Directional Ranges as well as operation on both types of VHF Runway Localizers, and the VHF Visual-Aural Airways Ranges. Simultaneous voice feature is included on these ranges. The *tunable* A.R.C. Receiver permits selection of any VHF aircraft frequency.

**The A.R.C. Type 17 or A.R.C. Type 18** is the companion communication equipment normally associated with the Type 15B. The Type 17 VHF Communication Equipment adds independent two-way VHF communication facilities. The Type 18 adds VHF Transmitting Equipment only. All Type 17 and 18 units are type-certificated by the CAA.

*The dependability and performance of these VHF Communication and Navigation Systems spells increased safety in flight. Specify A.R.C. for your next installation.*

ARC Aircraft Radio Corporation
BOONTON, NEW JERSEY
DEPENDABLE ELECTRONIC EQUIPMENT SINCE 1928



No. 4 in a series . . . (Advt.)

**So you'll know them, here are most of our staff. Standing, left to right: Willie Ellason, Bill Allen, Carl Fox. Seated, left to right: Abel Aguilar, James Terrell, R. L. Smith, Lee Lanford. Tony Aguilar held the camera. The airplane is Texaco's Mallard from Louisiana.**

# Radio Reviews

**DON'T CUSS** your aircraft radio's poor performance. Chances are that it was improperly serviced. Most nationally-known radio gear has passed strict tests, is widely accepted. But plow-hand mechanics can butcher the finest.

**SHAMEFUL ABUSES** come to us all the time from cussin' pilots who paid plenty for some so-called mechanic to botch things up. We get 'em without shock mounts, their insides jarred loose; without grommets and insulators, their wiring shorted out and ready to cause a fire; with jumbled circuits and overloads.

**YOU OUGHT TO SEE** how compact and precise good aircraft radio really is. We'll show you the innards any time you taxi onto our ramp. Then you'll recognize good installation and service practices . . . and take off with restored faith and confidence.

**KNOW-HOW IN RADIO SELECTION, INSTALLATION AND MAINTENANCE** is our specialty. Drop in to see us any time and talk radio with our communications specialists.

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★ **COLLINS** ★ **LEAR**

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**Doolittle Oil Field, Railway, Taxicab Communications**

Associated Radio
CARL FOX
TONY AGUILAR
LEE LANFORD
LOVE FIELD • DALLAS

2,300 rpm. It immediately goes to work and sends a signal to the propeller pitch motor to steepen the pitch of the blades the amount that is necessary to maintain engine speed at 2,050.

Now we can set the manifold pressure at the value that is required to give the desired rate of climb. During the initial part of the climb we certainly do not need full manifold pressure to maintain a good climb in the Bonanza so we reduce the throttle to 25 inches. This reduction in power would also reduce engine rpm. *if the APC were not installed.* The APC, however, senses the reduction in rpm. at its very beginning and sends a signal to the propeller pitch motor to go into flatter pitch. This new value of blade pitch is just the amount required to allow the engine to maintain constant speed.

Now as we climb and gain altitude the engine, without the APC, would tend to overspeed due to decrease in air density. The APC will again detect the increase and will automatically change propeller pitch to correct for it.

As we climb, gusts are encountered which would tend to change rpm. The APC detects these changes and immediately shifts propeller pitch to maintain constant speed.

When cruising altitude has been reached the plane is leveled off and cruising air speed is achieved. During this change in air speed the APC changes pitch continuously to maintain 2,050 rpm. and not overspeed.

While 2,050 rpm. can be used satisfactorily for high speed cruise in the Bonanza, a lower value such as 1,850 gives superior fuel economy. Therefore we turn the propeller speed knob slowly to the left until the tachometer reads 1,850. The APC functions to maintain engine speed at this new value in the same manner as was described above, regardless of changes in throttle setting, air speed, altitude, or gusts.

With the airport in sight the let-down is started by dropping the nose and setting throttle if necessary to set up desired let-down air speed. Nothing whatsoever is done to the propeller speed setting, as the APC will still maintain 1,850 rpm. which was set in for cruise. At the completion of the let-down and on final approach the propeller speed knob is turned full to the right against the take-off stop. With throttle closed, or almost closed, the APC signals the propeller pitch motor for full flat pitch to maintain take-off rpm. As the air speed and power are further reduced on the approach the rpm. will drop due to the fact that the blades are at the limit of full flat pitch and the engine, therefore, can no longer maintain full rpm. Engine speed will then vary depending upon throttle setting and air speed. Now note the angle of descent. It is appreciably steeper than normal due to the aerodynamic braking of the blades in full flat pitch. This reduces the landing distance over a 50-ft. obstacle by as much as 25 per cent.

Extensive tests have proved the Automatic Propeller Control gives marked improvement in the operations of an aircraft whose performance is already outstanding ★ ★ ★

## Airmen's Calendar

June 16-17—ADMA mid-year meeting, Colorado Springs.

June 17-18—Annual Ohio Aviation Clinic, Bowling Green State University.

June 19-26—Colorado Avia. Week.

June 26-27 — 27th Annual NAA Convention, Akron, Ohio.

July 1-4—Third Annual Air Force Association Convention, Stevens Hotel, Chicago.

July 2-10—National Soaring Meet, Elmira, N. Y.

July 3-4—First National Air Fair, Chicago Orchard Airport.

July 3-4—Houston International Air Speed Run, La Porte Airport, Houston.

July 17-18—Seventh Annual All-Dixie Air Show and Trading Day, Chattanooga, Tenn.

Sept. 3-5 — National Air Races, Cleveland.

## Iowa Events Listed on Colorful Calendars

Private fliers and operators serving them may obtain complete information on this season's many aviation events in Iowa from the Iowa Aeronautics Commission, which has distributed colorful wall calendars with events listed. "All over Iowa this summer, aviation events are planned for your enjoyment," reads the heading on the calendar. "Introduce yourself to the advantages of air travel by contacting your local airport for further details." Norbert Locke, director of the Iowa Commission, is also distributing comprehensive loose-leaf directories of airports in this state, with drawings and all pertinent details. ★ ★ ★


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**Honolulu non-stop to Teterboro, N. J. Official Great Circle distance of 4,957.24 miles; actual distance, 5,273 miles. Average miles per gallon, 19.37. Average ground speed, 146.3 miles per hour.**

# When the chips are down

Not many people want to sit in one place for 36 hours; let alone try to fly an airplane continuously for that period, through darkness, snowstorms, thunderstorms, and icing conditions, as well as fair weather.

But Captain Bill Odom's demonstration of a BEECHCRAFT Bonanza from Honolulu to Teterboro non-stop (5,273 miles) is a worthwhile addition to the pride of ownership of all Bonanza owners.

The ocean flight, beginning at 3,858 pounds gross weight, through instrument conditions; the passage through thunderstorms, icing conditions, and snowstorms over the western ranges of the United States; and the amazing economy of 19.37 miles per gallon of gasoline, and 3,500 miles per gallon of oil; all prove that the BEECHCRAFT Bonanza has what it takes "When the Chips are Down."

All Bonanza owners can take added pride in their choice of a personal airplane from this legendary exploit.

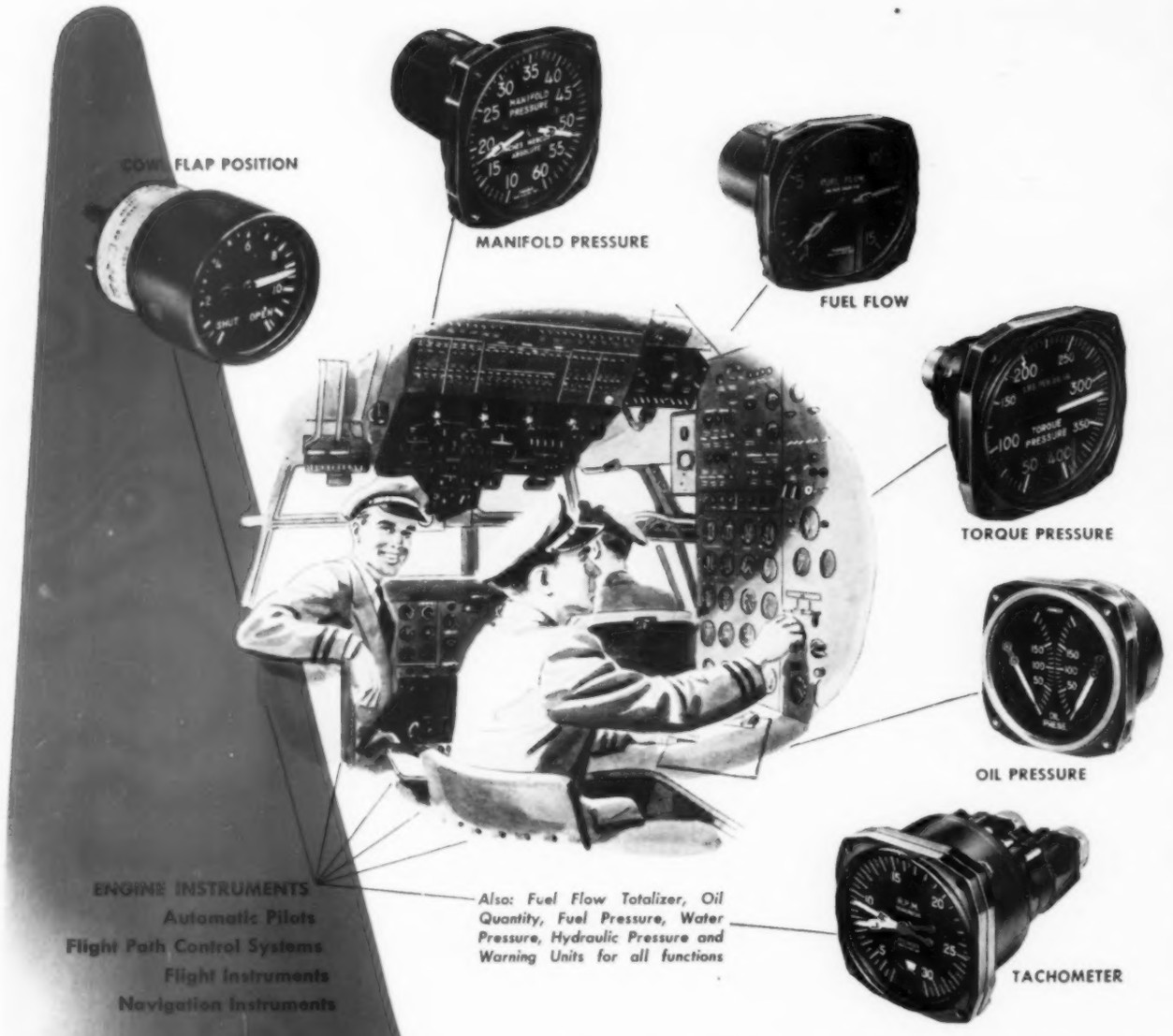
**Apply Bonanza Transportation to your business**

Company ownership of this fast, *quiet* plane turns travel days into travel *hours* — time saved you can put to *profitable* use. Investigate! A note on your company letterhead will bring an informative 60-page brochure on "The Air Fleet of American Business." Write today to Beech Aircraft Corp., Wichita, Kansas.

*Top speed, 184 mph*
*Cruising speed 170 mph*
*Range, 750 miles*

Beechcraft
BONANZA
MODEL A35

***BEECHCRAFTS ARE THE AIR FLEET OF AMERICAN BUSINESS***

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